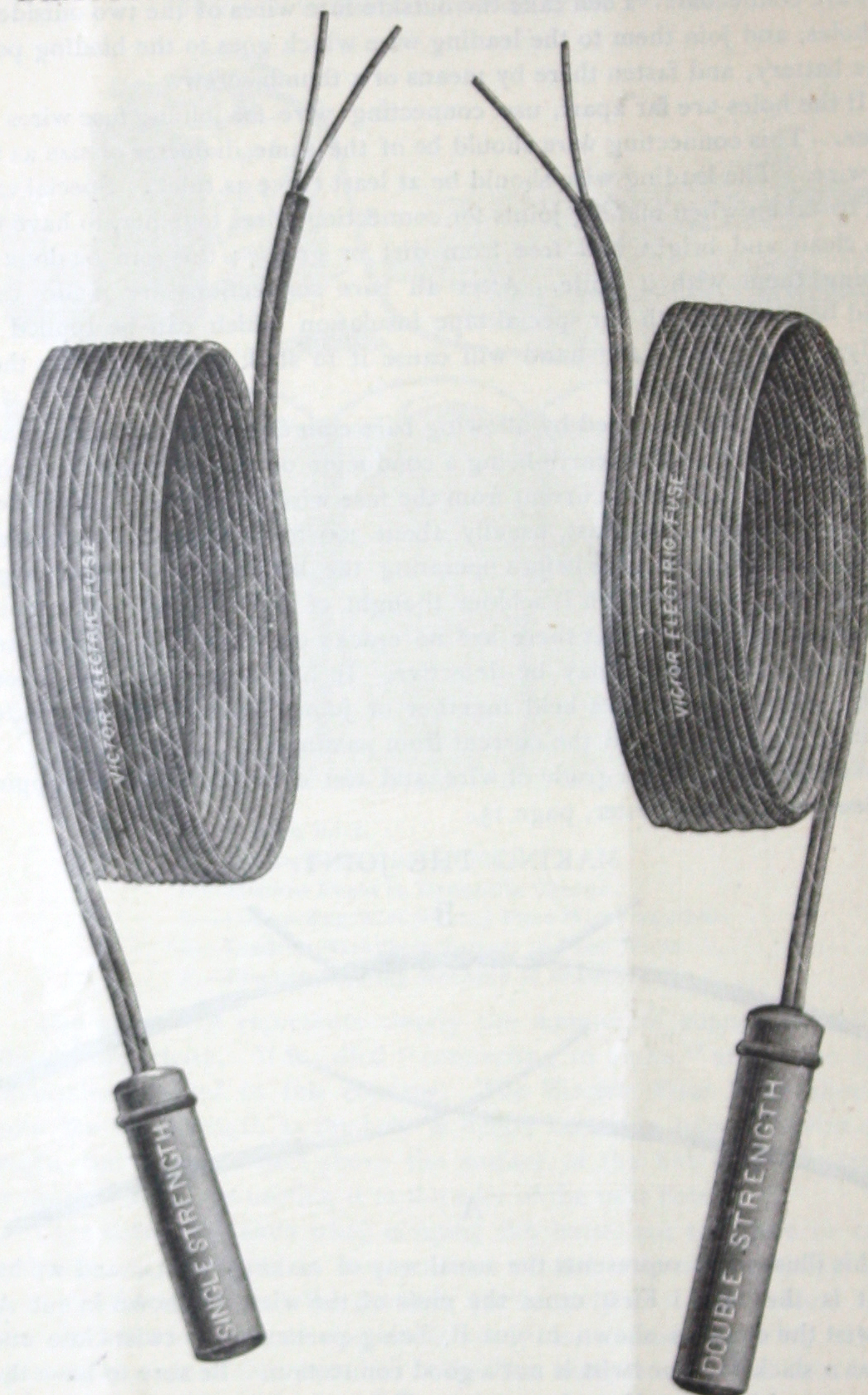


# VICTOR ELECTRIC FUSES.

FOR EXPLODING ALL GRADES OF  
BLASTING POWDER AND HIGH EXPLOSIVES.

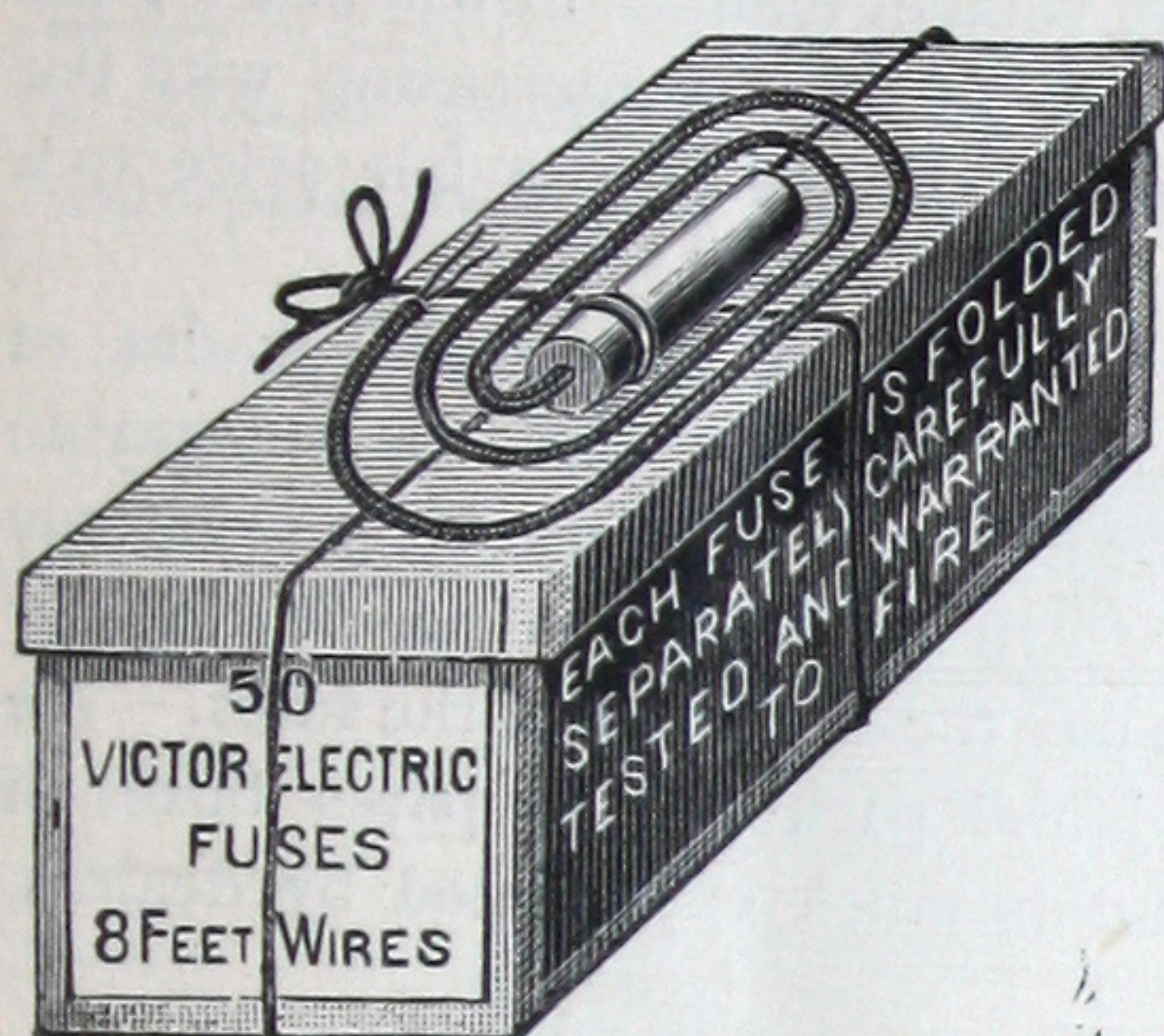


EACH FUSE FOLDED SEPARATELY AND PACKED IN PAPER BOXES OF  
FIFTY EACH. NO WASTE. NO DANGER IN SEPARATING.  
NO SNARLING OR TANGLING OF THE WIRES.



# VICTOR ELECTRIC PLATINUM FUSES.

[PATENTED DECEMBER 11, 1888.]



FEW people stop to consider the position which an electric fuse occupies in electric blasting. It is the essential article in that system, and should be selected with great care and caution, for without a reliable fuse labor and material are lost.

It is inserted in the dynamite charge, and is exploded by means of an electric current, generated by the blasting machine or battery. The electric current, passing through the wires, heats the platinum bridge in the fuse and explodes it, the explosion or concussion of which fires the dynamite in the hole. You will therefore see how important it is to have a fuse which is perfect and reliable. A cheaply made, low price fuse should be avoided. The best is none too good when so much is depending upon it.

Electric fuses, or exploders, as they are commonly called, should have their wires of the purest copper, of a size of about twenty gauge. well insulated with the best of cotton, wound double; the second winding should be the reverse of the first, then insulated with a waterproof insulation. The copper shell, or cap, should contain a very strong and powerful explosive, about double the strength of the best blasting cap, as the stronger the cap, the better results will be obtained from the powder, especially in cold weather. Fuses made with weak caps may explode the powder, but will do so imperfectly, as a weak detonation will create only a slow burning of the explosive; consequently, a great part of the strength is lost.

We claim for our Victor Electric Platinum Fuses the highest grade of perfection in all respects. That is our aim from the time we commence to make them until they are finished. We never try how cheaply we can make them, but how good and reliable. We select the purest copper wire, insulate the bare wire with our special liquid insulation; then double wind with sixteen strands of best cotton; then waterproof with our special waterproof insulation.

Our system of soldering the platinum ends is done with a special automatic machine, which insures an absolute uniformity and equal resistance in each fuse, thereby securing the simultaneous explosion of each fuse, which is most essential. We test all soldered joints electrically, and when the fuses are complete each one is again tested, and only perfect fuses are packed for



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CCA



662.28 J. F. Harrison 62223-1  
Macbeth

# ROCK BLASTING BY ELECTRICITY.

—1891.—

Explosives  
ILLUSTRATED CATALOGUE AND PRICE-LIST

—TOP—

662.4

## Victor Electric Platinum Fuses

ELECTRIC BLASTING MACHINES,

ELECTRIC FUSE AND BLAST TESTERS,

WIRE REELS, BATTERY TESTERS,

INSULATING TAPE,

LEADING AND CONNECTING WIRES,

—MANUFACTURED BY—

### JAMES MACBETH & CO.

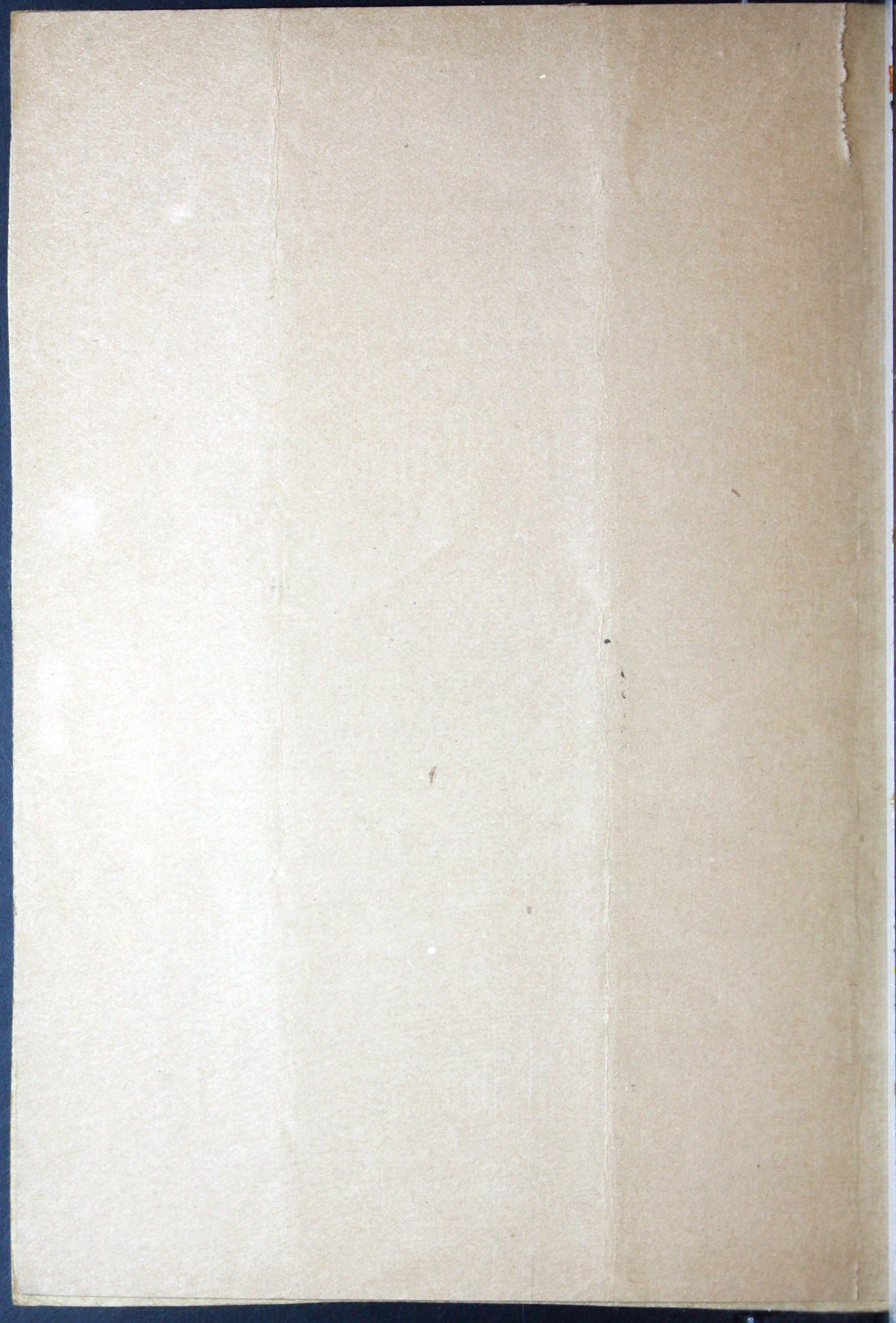
128 Malden Lane, New York City.

U. S. A.

CABLE ADDRESS, "FENBUCKLE."

FOR SALE BY







APRIL 1st, 1891.

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# Illustrated Catalogue and Price-List

—: OF :—

## JAMES MACBETH & CO.,

MANUFACTURERS OF

### VICTOR ELECTRIC PLATINUM FUSES,

ELECTRIC BLASTING MACHINES,

ELECTRIC FUSE and BLAST TESTERS,

WIRE REELS, BATTERY TESTERS,

JOINT INSULATING TAPES,

LEADING and CONNECTING WIRES.

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OFFICE,

128 Maiden Lane, New York City, U. S. A.

CABLE ADDRESS, "FENBUCKLE."

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FACTORY, - - - - JAMAICA, L. I.

Prices subject to change without notice.

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—FOR SALE BY—



## TO THE TRADE.

IN preparing this Catalogue we have endeavored to make plain the method of manufacturing and using electric appliances for rock blasting purposes. In doing this we are of opinion that the interests of both manufacturers and users of our appliances will be better served than if we endeavored to shroud these details in mystery. Our line of goods includes many new and useful devices never before placed upon the market.

Our goods will be offered at the lowest possible prices consistent with the high standard of merit which we always maintain.

Our factory is one of the largest and best equipped in the United States. It is fitted throughout with the latest and most improved machinery; its location, close to New York City, enables us to make prompt and direct shipments, giving our customers the benefit of best freight rates and the least possible rehandling. We carry a large stock, and are prepared to fill all orders promptly—telegraph orders within a few hours.

All our fuses, blasting machines and wires are made with the utmost care, with best material and workmanship, and carefully tested before leaving our works. We warrant them in every respect.

When ordering, give shipping directions plainly. All our goods are packed with special care, and we will not be responsible for damage, breakage, or delay in transit after we deliver in good order to transportation line. We ship free on board at New York. All boxes or cases used for packing, either for home or export trade, will be charged for at actual cost to us. Our terms are thirty days, net, to responsible parties, unless otherwise agreed.

Prices subject to change without notice.

It is a fact to be regretted that the majority of blasters who use electric appliances know little, or perhaps nothing, about the principle of electricity. It might, therefore, seem almost impossible that success should attend their efforts. In theory, this may be so; but in practice the blasters can often outdo the electricians in preparing and firing the blast. They seem to educate themselves to that special line and become experts, and can give many valuable points regarding their profession to electricians which are worth considering.

There are, however, many mine captains, superintendents and foremen who are good electricians, and to some of them we are indebted for much information presented in this Catalogue, and shall always be pleased to entertain any remarks or suggestions which they may have to make.

Heretofore, very little has been published to enlighten blasters in the use of electric appliances; and, while we may not be very thorough in our description, yet we hope what little we present in this Catalogue will be helpful.

Respectfully yours,

JAMES MACBETH & CO.



## ELECTRIC BLASTING.

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ROCK blasting by electricity is acknowledged to be the most effectual, and for economy, safety and certainty of action supersedes any other system. By electric firing a large number of holes can be exploded simultaneously, thereby utilizing the united strength of the explosive at the same instant, and obtaining at least ten per cent. more execution from the powder than if the holes were fired independently with the old style safety fuse.

We believe a twenty-five or thirty per cent. nitro-glycerine dynamite will lift more rock, when fired simultaneously by electricity, than would a forty or fifty per cent. dynamite, if holes were fired independently with tape safety fuse. It has also been proven that the same amount of work can be done with a less number of holes, where electricity is employed, than would be required if the charge were fired singly with tape fuse.

In such places as shafts and tunnels, where ventilation is defective, it is usual for the workmen to wait perhaps half an hour or more after each blast, to allow the smoke and fumes to clear away; and as several blasts are made daily, much valuable time is lost. By our electric system and the selection of a properly made dynamite, the loss of time is reduced to a minimum. Not only are there less smoke and fumes, but fewer blasts are necessary to do the same amount of work.

In the case of a misfire, the advantage of electric firing is still more evident, since, if the holes are not all simultaneously exploded, there can be no possibility of its exploding afterward; therefore, there can be no danger in approaching the face at once to discover the cause. How different are the facts with the tape fuse under the same conditions. The life of the blaster is in danger, as a hole may explode at any time after he thinks there is no probability of its doing so. Discard the old-time, slow and dangerous system, and use our safe, reliable and economical electric system.

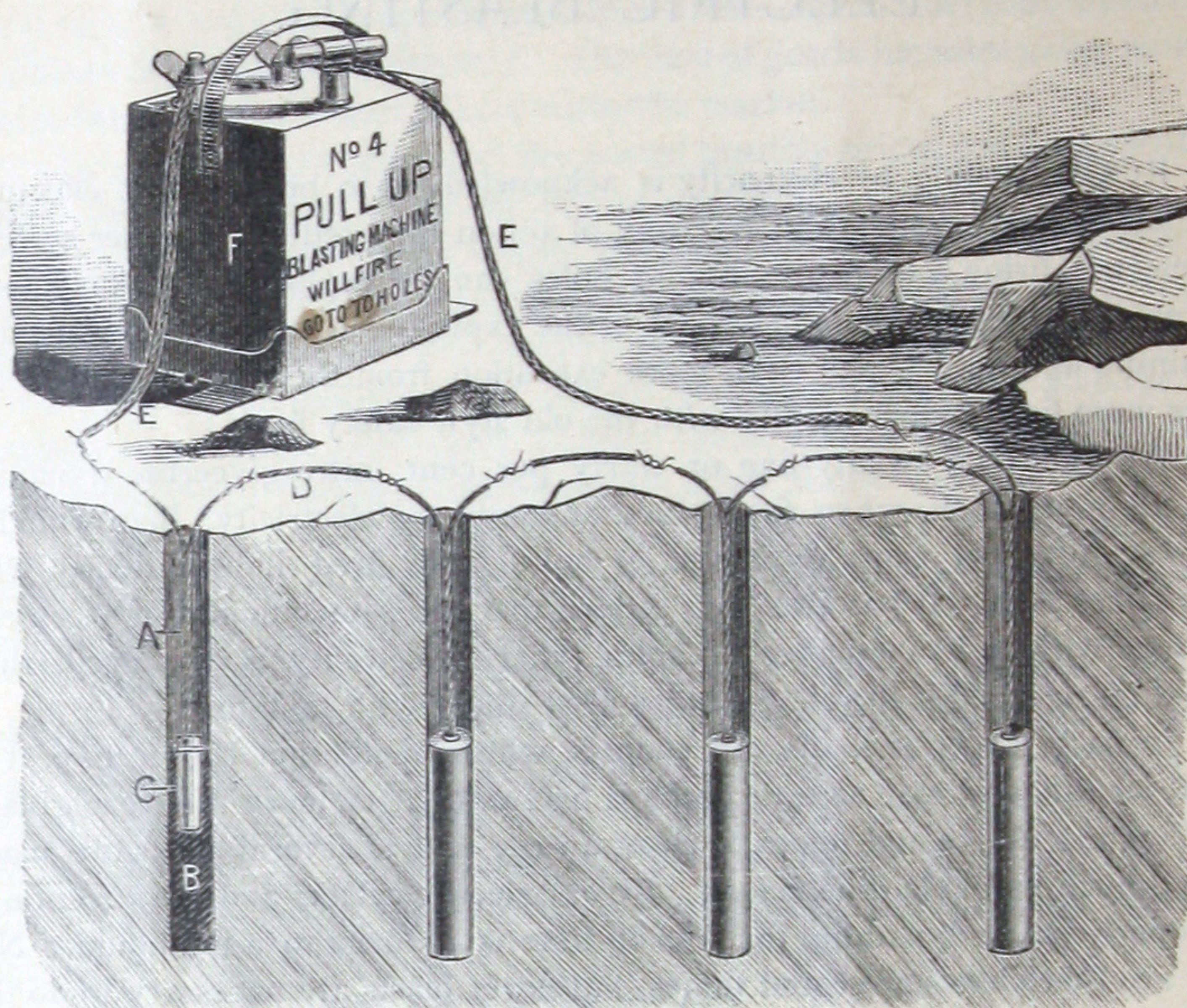
In submarine work and in very wet shafts electric blasting is indispensable, as the charge can remain several hours, even days, in water before firing without deteriorating, thus giving time to complete the loading of holes, and to make the necessary preparations before exploding the charge.

In mining gold, silver, lead, copper, iron ore, coal, salt, etc., we recommend our electric appliances. Also for shafts, tunnels, quarry work, stump blasting, railroad work, well sinking, earth banks, and for all work requiring the use of blasting powder or dynamite, we recommend our electric system as superior in all respects to any other.



## ROCK BLASTING BY ELECTRICITY.

## SHOWING HOLES CONNECTED IN SERIES.

*With Directions for Connecting the Wires.*

- A.—Hole in Rock.
- B.—Dynamite Charge in Hole.
- C.—Electric Fuses in Dynamite Charge.
- D.—Connecting Wire joining Fuse Wires together.
- E.—Leading Wire from Battery to Fuse Wires.
- F.—Electric Blasting Machine or Battery.

The above cut represents clearly the manner of connecting holes for firing by electricity. It is called "connecting in series," and is the system universally adopted in this country. The Electric Fuse Wire should be about the same length as the hole is deep; better to have the wire a little longer, that it may project above the surface of the hole after it is tamped, for the purpose of connecting it to the wire of the next hole.

Care should be taken when tamping the holes, not to injure or cut the insulation on the wires, as bare portions of the wire or bare joints should never be allowed to touch the ground; particularly so if the ground is wet. After the holes are tamped and made ready to connect for firing, take and separate the ends of the two wires in the first hole, leaving the outside wire for connecting with the leading or battery wire; then join the inside wire of



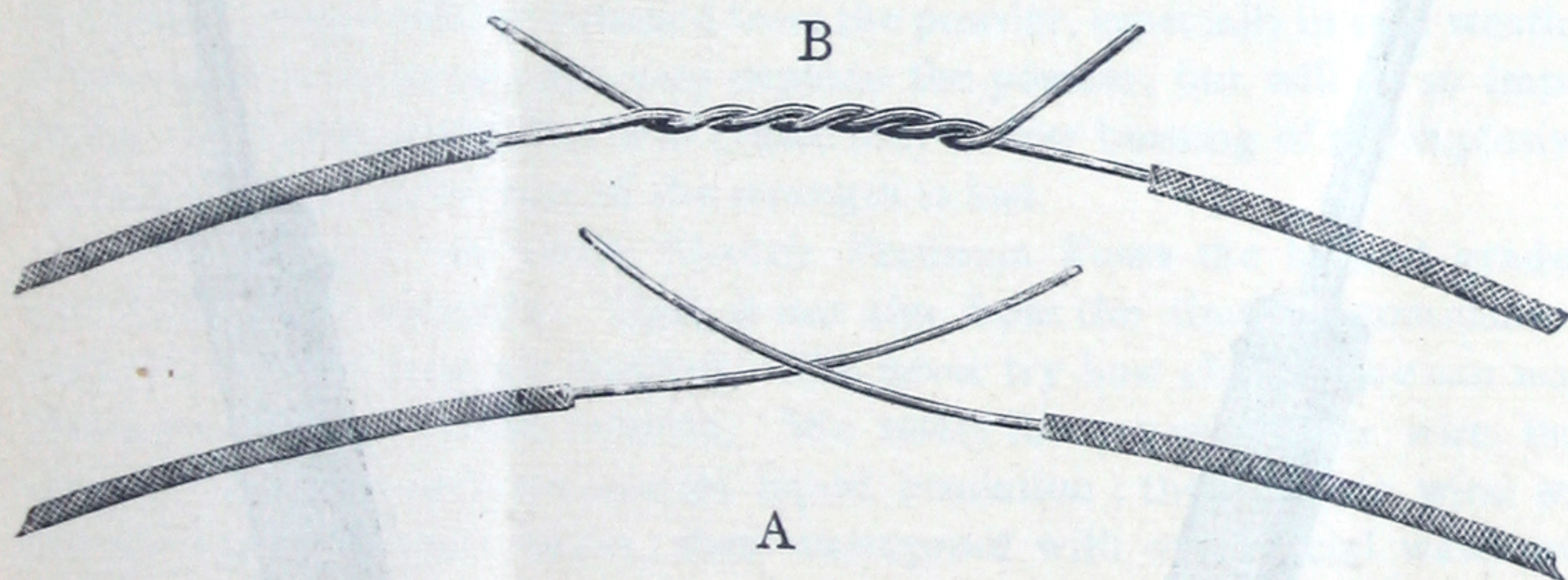
the first fuse to the nearest wire of the second fuse; then the other wire of the second fuse to one of the wires of the third fuse, and so on until all fuse wires are connected. Then take the outside fuse wires of the two outside or end holes, and join them to the leading wire which goes to the binding posts of the battery, and fasten there by means of a thumb-screw.

If the holes are far apart, use connecting wire for joining fuse wires together. This connecting wire should be of the same diameter or size as the fuse wire. The leading wire should be at least twice as thick. Special care must be taken when making joints for connecting wires together, to have the ends clean and bright, and free from dirt or grease; this can be done by scraping them with a knife. After all bare connections are made, they should be covered with our special tape insulation which can be applied instantly. The heat of the hand will cause it to stick fast and make a thoroughly water-proof joint.

Many blasts have failed by allowing bare connections to come in contact with the ground. The earth being a conductor of electricity and offering less resistance, draws the current from the fuse wires. Batteries should be a safe distance from the blast, usually about 300 to 500 feet. All workmen should be at a safe distance before operating the battery to fire the charge. An important matter which is seldom thought of by blasters, is to examine the leading wire, to see that there are no cracks or breaks in it. Even new lengths of leading wire may be defective. It has been found so in long lengths, where the ends are held together or joined only by a heavy cotton braiding, which prevented the current from passing.

We manufacture this grade of wire, and test every coil before shipping it. See our Electric Tester, page 15.

#### MAKING THE JOINT.

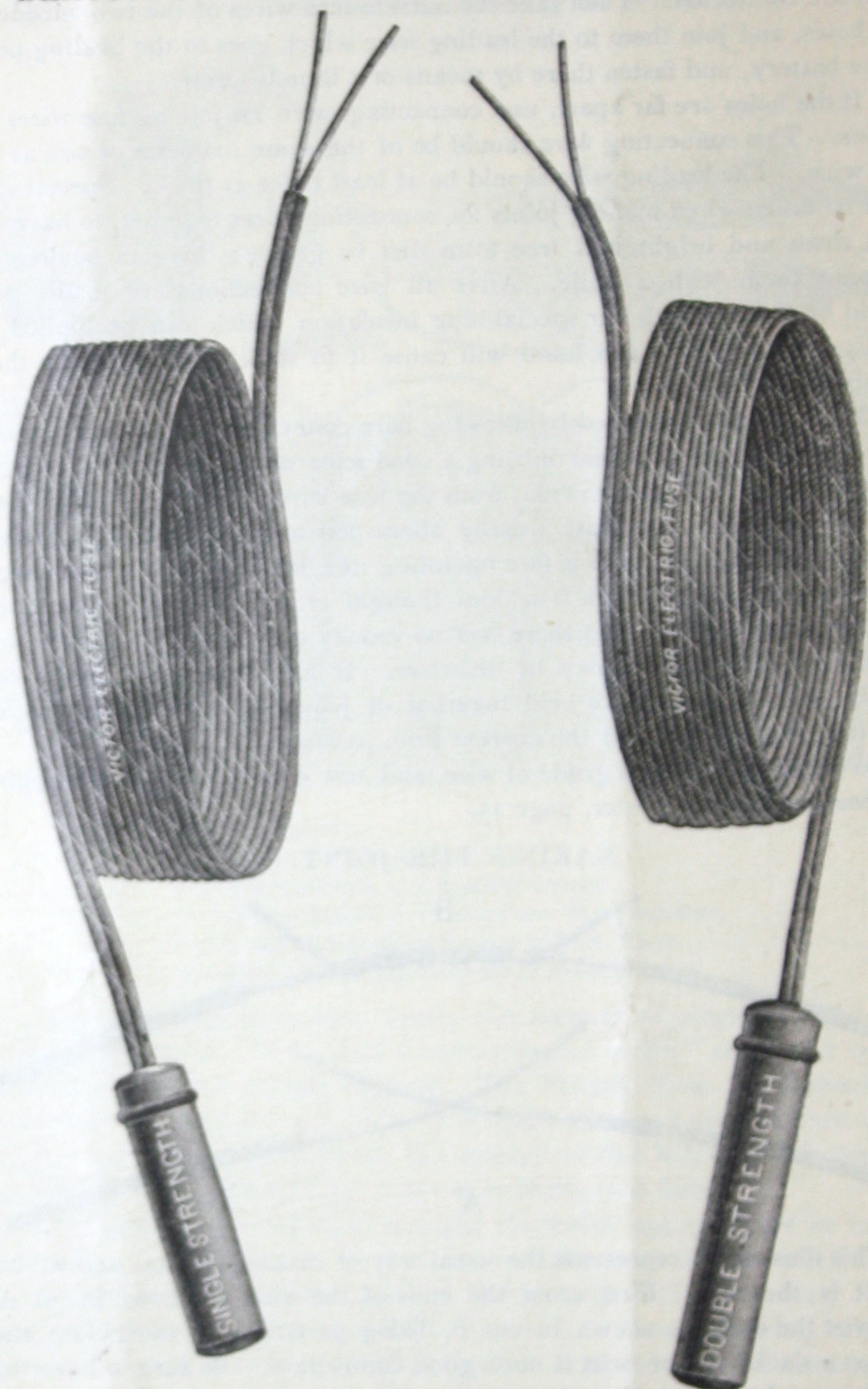


This illustration represents the usual way of making joints, and we believe it is the best. First cross the ends of the wire, as shown in cut A, then twist the ends, as shown in cut B, being particular to twist close and tight, as a slack joint or twist is not a good connection. Be sure to have the ends clean and bright. Keep bare joints off the ground.



# VICTOR ELECTRIC FUSES.

FOR EXPLODING ALL GRADES OF  
BLASTING POWDER AND HIGH EXPLOSIVES.

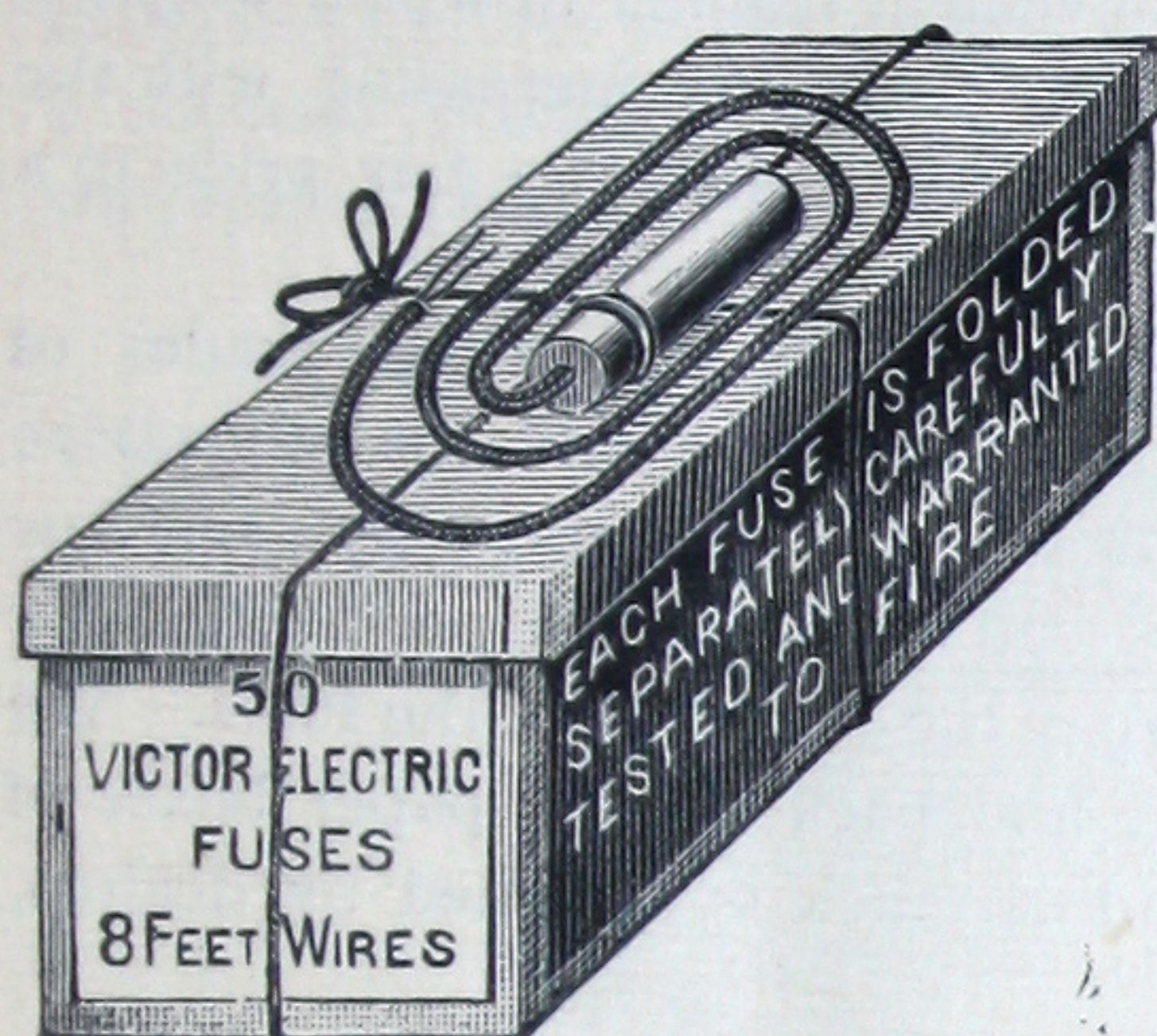


EACH FUSE FOLDED SEPARATELY AND PACKED IN PAPER BOXES OF  
FIFTY EACH. NO WASTE. NO DANGER IN SEPARATING.  
NO SNARLING OR TANGLING OF THE WIRES.



## VICTOR ELECTRIC PLATINUM FUSES.

[PATENTED DECEMBER 11, 1888.]



FEW people stop to consider the position which an electric fuse occupies in electric blasting. It is the essential article in that system, and should be selected with great care and caution, for without a reliable fuse labor and material are lost.

It is inserted in the dynamite charge, and is exploded by means of an electric current, generated by the blasting machine or battery. The electric current, passing through the wires, heats the

platinum bridge in the fuse and explodes it, the explosion or concussion of which fires the dynamite in the hole. You will therefore see how important it is to have a fuse which is perfect and reliable. A cheaply made, low price fuse should be avoided. The best is none too good when so much is depending upon it.

Electric fuses, or exploders, as they are commonly called, should have their wires of the purest copper, of a size of about twenty gauge. well insulated with the best of cotton, wound double; the second winding should be the reverse of the first, then insulated with a waterproof insulation. The copper shell, or cap, should contain a very strong and powerful explosive, about double the strength of the best blasting cap, as the stronger the cap, the better results will be obtained from the powder, especially in cold weather. Fuses made with weak caps may explode the powder, but will do so imperfectly, as a weak detonation will create only a slow burning of the explosive; consequently, a great part of the strength is lost.

We claim for our Victor Electric Platinum Fuses the highest grade of perfection in all respects. That is our aim from the time we commence to make them until they are finished. We never try how cheaply we can make them, but how good and reliable. We select the purest copper wire, insulate the bare wire with our special liquid insulation; then double wind with sixteen strands of best cotton; then waterproof with our special waterproof insulation.

Our system of soldering the platinum ends is done with a special automatic machine, which insures an absolute uniformity and equal resistance in each fuse, thereby securing the simultaneous explosion of each fuse, which is most essential. We test all soldered joints electrically, and when the fuses are complete each one is again tested, and only perfect fuses are packed for



shipment. We can therefore warrant our fuses to fire and to be better and stronger than any others made.

Our prices are perhaps a little higher than some less carefully made fuses ; but, considering quality and the convenient manner in which we pack them, it is not surprising that our business is constantly increasing with the best class of trade, which always prefers a good article at a fair price to a poor article because it is cheap.

Our double strength fuses are made especially for certain grades of powder, which require a specially strong detonator, and for submarine blasting, but are equally well adapted for any class of work. By using our double strength fuses, we claim that there can be used a ten per cent. lower grade of dynamite, which will more than pay the extra cost of the fuses. We fold each of our Victor Fuses separately, and pack in neat paper boxes of fifty each, which is very convenient, and is much appreciated by dealers, blasters and consumers generally.

Each fuse connected for the blast should be of equal resistance to insure a simultaneous explosion ; consequently, fuses made by different manufacturers should not be used together in the same blast. Each Victor Fuse is warranted equal in resistance. This important advantage is not claimed by other manufacturers.

To obtain best results, our Electric Fuses should be fired with our own blasting machines, but can be exploded with any other reliable magneto-machine now on the market. Our blasting machines will also fire any other make of platinum fuses. We carry in stock a full line of fuses, with the following lengths of wire :

**4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28 and 30 feet.**

Longer or shorter lengths made to order; also fuses with gutta-percha covered wires, or other special wire for submarine blasting, etc., made to order at short notice ; also fuses of any desired strength, for special purposes, made to order.

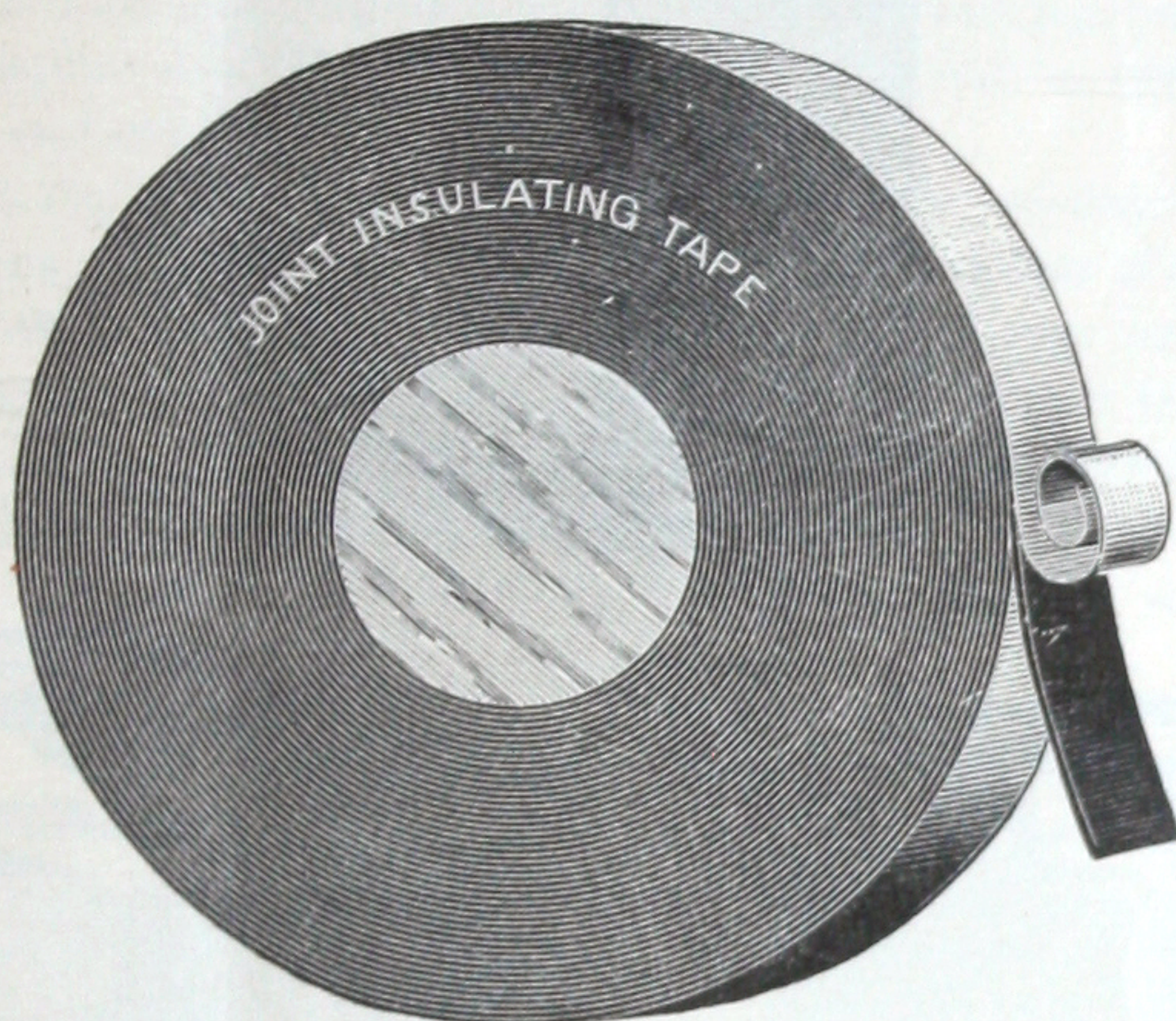
Our Victor Fuses, having larger conducting wires, better insulation and greater strength than any other fuses made, we will warrant them to fire any make of blasting powder, gelatine powder, ammonia powder, all high explosives, dynamite, or any other nitro-glycerine or chemical compound now manufactured in the United States or foreign countries. Our manner of packing the fuses, by folding each separately and putting them up in strong paper boxes of fifty each, is a great protection against dampness or change of climate, as well as a convenience in handling.

All shipments made to Mexico, Central or South America, or other hot climates, are packed in extra strong cases, tin lined, and otherwise well protected.



## JOINT INSULATION TAPE.

This is a most useful and convenient article for covering bare wire joints in blasting, either on dry ground or under water. Its composition is okonite; a superior insulating compound. It makes a perfectly and thoroughly waterproof joint, and can be applied instantly. The heat of the hand will



cause it to stick fast to the bare wire and it cannot be removed, except by cutting it off. It is put up in half-pound packages, in widths of  $\frac{1}{2}$  and  $\frac{3}{4}$  inches. It costs but a trifle, and should be generally used by all blasters for covering bare connections.

## DIRECTIONS.

Before using, remove the cloth which is only placed upon it to separate the layers, and prevent the compound from sticking together.

Wrap the joint thoroughly, taking pains to have the tape overlap, then apply a little heat from a lighted match, when it will be found impossible to remove the tape, without tearing it, thus making

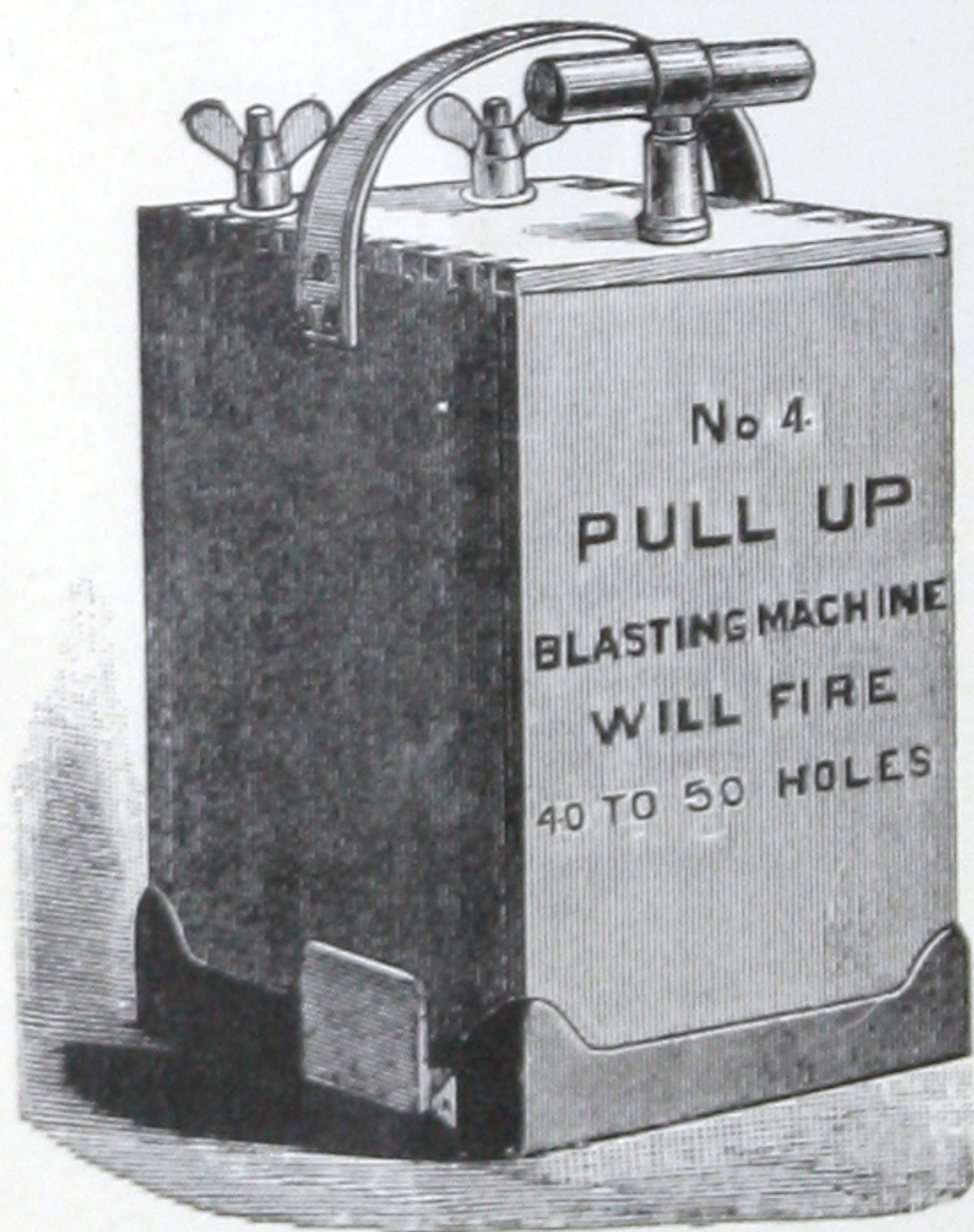
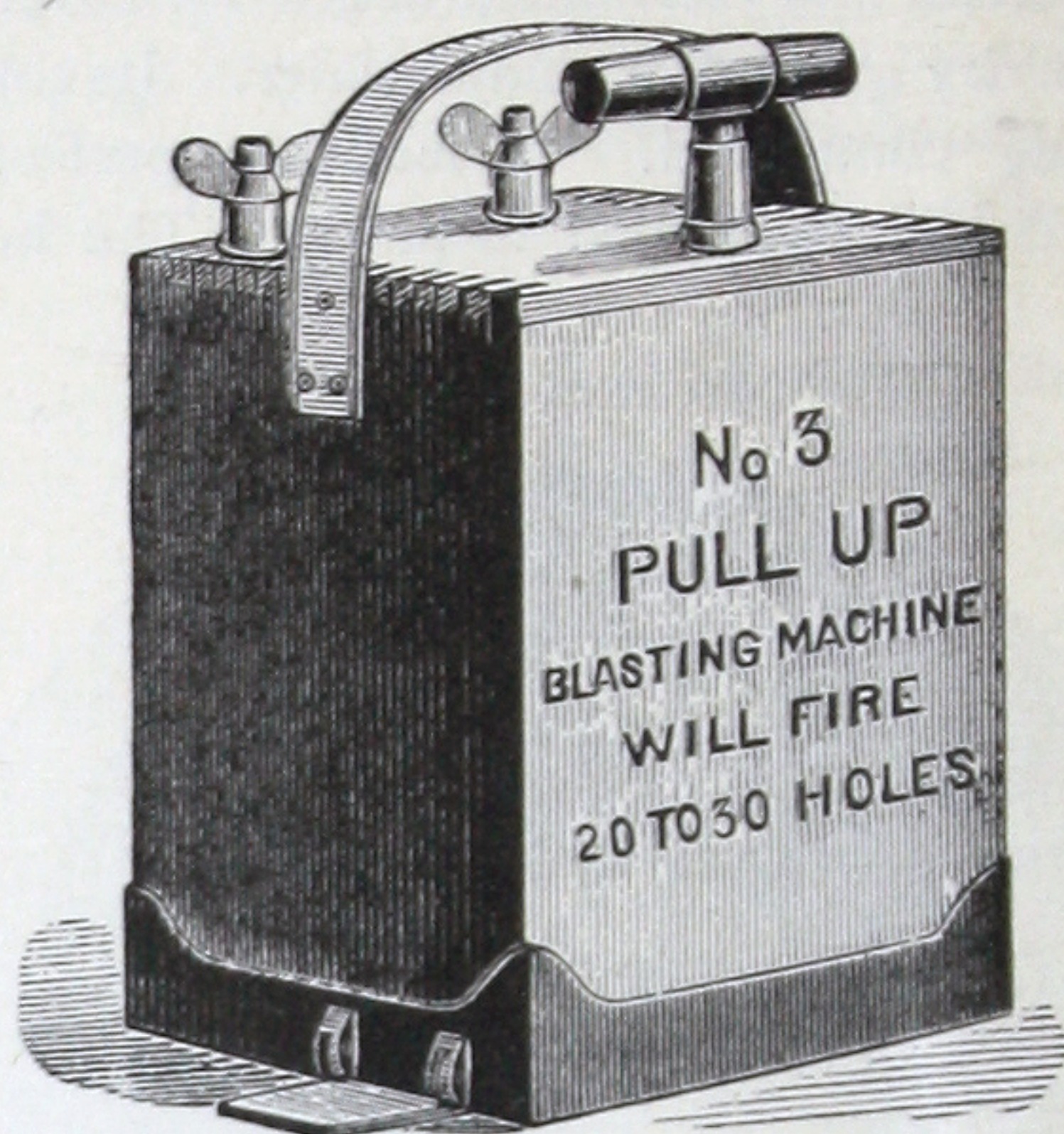
## A THOROUGH WATERPROOF JOINT.

The application of heat preferable, but not absolutely necessary.



# "PULL UP" MAGNETO BLASTING MACHINES.

[Patented February 9th, 1892.]



No. 3 will Fire 20 to 30 Holes.	Price, - - - - -	\$25.00
No. 4 will Fire 40 to 50 Holes.	Price, - - - - -	50.00
No. 5 will Fire 75 to 100 Holes.	Price, - - - - -	75.00

This new and improved Blasting Machine has many advantages over the old style machines. The field pieces are of an improved design between which is fitted to revolve an armature wound to a very high resistance.



The rapid revolving of the armature by pulling up the operating bar, generates an electric current of high electro-motive power, which, at the moment of its maximum intensity, is sent out to the outside circuit, in which are the fuses, the explosion of which is instantly accomplished.

These machines are operated by a very easy and simple motion, which works smoothly and without any strain upon the parts. The operating bar, after being pulled up to fire, will fall back into its place of its own weight, and is ready to be used again. All parts are made strong and durable, there being no coils to burn or springs to break; they do not easily get out of order, consequently require no expensive repairs—a fact that will be appreciated by all contractors and miners.

The "Pull Up" Blasting Machines, are specially constructed to meet the requirements of those who desire to fire a large number of shots at one time; they are the strongest and most powerful machines ever made for electric firing—are specially adapted for sub-marine blasting and large mining works. The iron base and bottom will be found a great improvement and protection against wear and dampness.

Both our "Victor" and "Pull Up" Machines will fire any make of electric platinum fuses.

#### DIRECTIONS.

To fire with the "Pull-Up" Machines, turn down the hinged iron plates at the bottom of the box; stand on these plates with both feet to hold the machine firmly down; then pull the bar quickly *with one continuous stroke*—with both hands—when the blast will take place. After firing, the bar will drop back into its place, and is ready to be used again. Make sure the bar is all the way down when starting to pull it up. The quicker you pull up the bar the more current the machine will generate. In pulling up the bar increase the stroke as you come up, but don't stop half way; it must be one continuous stroke from start to finish.

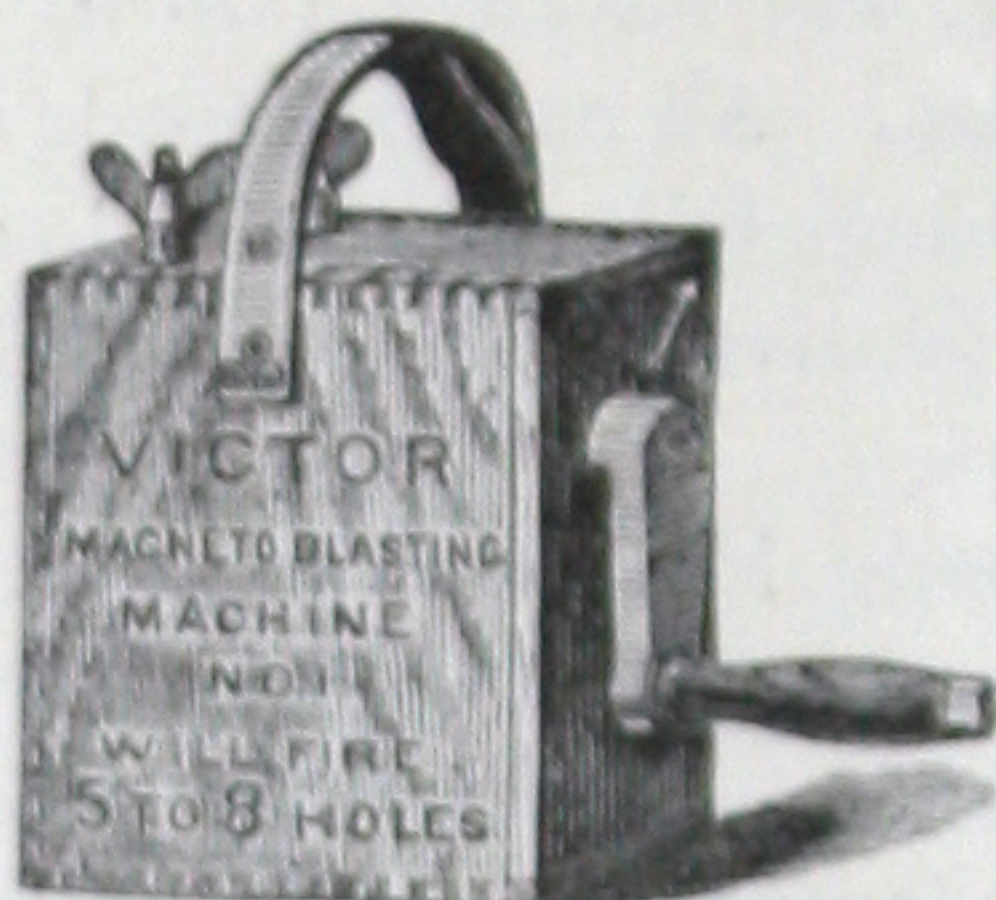
These Machines are warranted to fire the number of holes claimed at a distance of 1,500 to 2,000 feet, provided our fuses and leading wires are used.

See our Electric Lamp for testing the current in these batteries.





## "VICTOR" MAGNETO BLASTING MACHINE.



No. 1 will Fire 5 to 8 Holes. Price, - - \$15.00

This small No. 1 "Victor" Machine, for firing 5 to 8 holes, weighing only 15 lbs.,  $7\frac{1}{2} \times 7 \times 4\frac{1}{2}$ , will be found very useful and convenient for prospecting, quarrying or stump blasting purposes, or where a large battery is not required. Although small in size, and low in price, it receives the same care in making as our larger machines, and will be found equally serviceable for the class of work it is intended for.

The Handle can be unscrewed and placed in the leather strap for convenience in carrying, or when not in use.

### DIRECTIONS FOR FIRING.

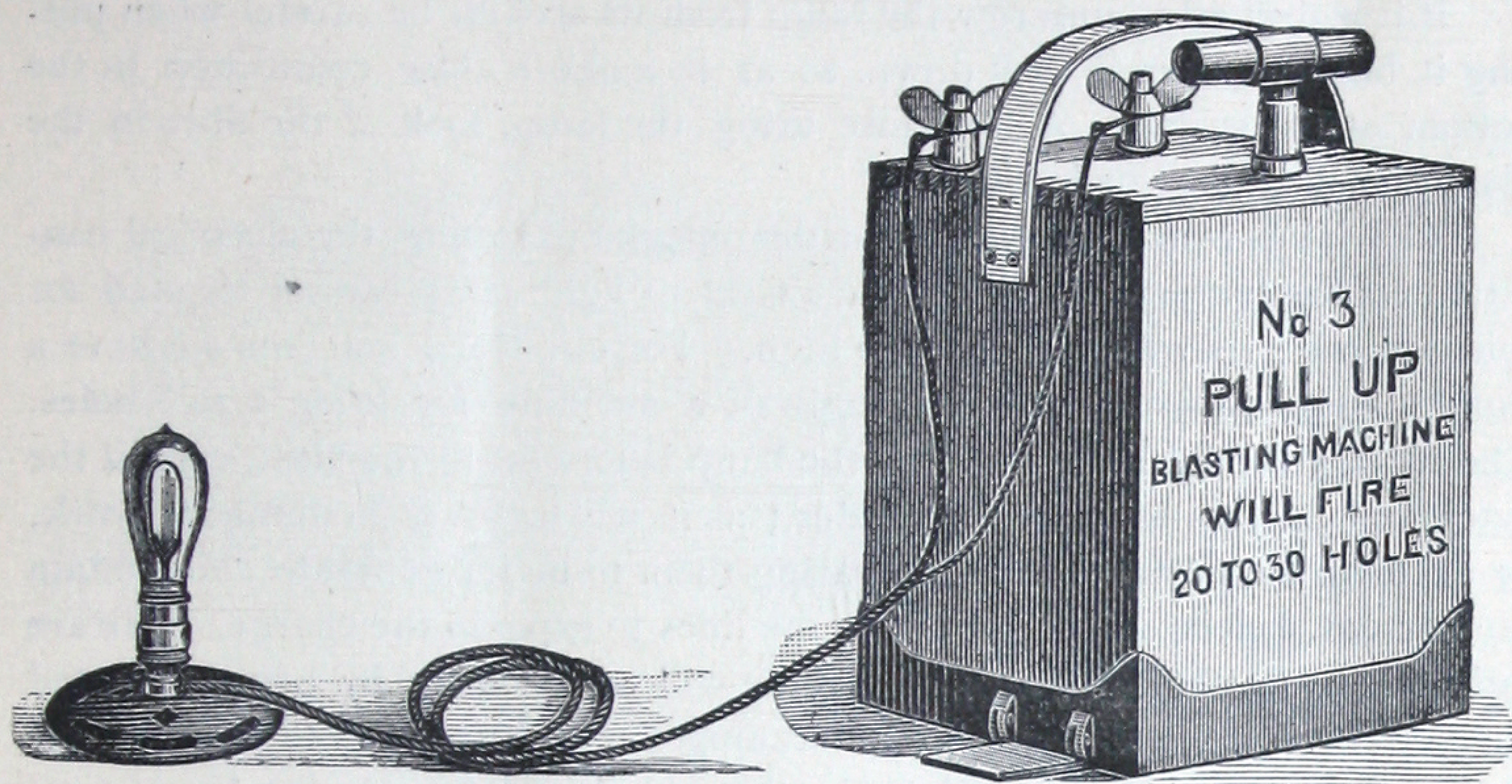
Place the handle over the arrow point mark on the box ; turn it downwards with a very quick and sudden jerk, and the blast will take place. Half a turn of the handle from the mark is sufficient ; but if failing to go off first time, repeat the same motion more quickly. The firing will never fail if you push quickly, as directed, and with a continuous stroke. The strength of current depends upon the rapidity with which the handle is turned.

When shipping our machines we enclose full directions for using them.

See our Electric Lamp for testing the current in these batteries, page 13.



## TESTING THE BATTERY.



The above cut represents a small electric lamp, for testing the condition and strength of current in the battery or blasting machine. Heretofore, blasters had no means of ascertaining whether their battery was in good order or not; and if the blast failed to go off, they were at a loss to know if the trouble was with the battery, fuses, or connections. We now come to the rescue of the blaster, to help him out. This lamp will tell him the condition of his battery. Our "standard" tester will tell him if the fuses, wires, connections, joints, or even the entire blast, are right or not.

We believe he will appreciate these devices.

## DIRECTIONS FOR TESTING THE BATTERY.

Place the ends of the wire attached to the lamp, in the binding posts of the battery, as shown in cut, page 13, then operate the battery the same as if firing a blast, when the lamp will show an incandescent light, or a white flash if the current is very strong. If the current is weak, it will only slightly redden the fiber in the glass bulb. If the battery does not even redden the fiber in the lamp, the battery is not in good order and will not fire a blast. It should be sent for repairs. Any Magneto battery that will not slightly redden or flash the lamp will not fire 15 or 20 holes.

Our No. 5 Battery, for firing 100 holes, is so powerful that it is likely to burn out the lamp if operated to its fullest extent for three or four times in rapid succession. One or two operations will be sufficient to test the battery. When any of our batteries are out of order, send them direct to us for repairs. We will return them promptly, and charge only actual cost.



Mechanics or electricians, as a general rule, do not understand repairing blasting machines.

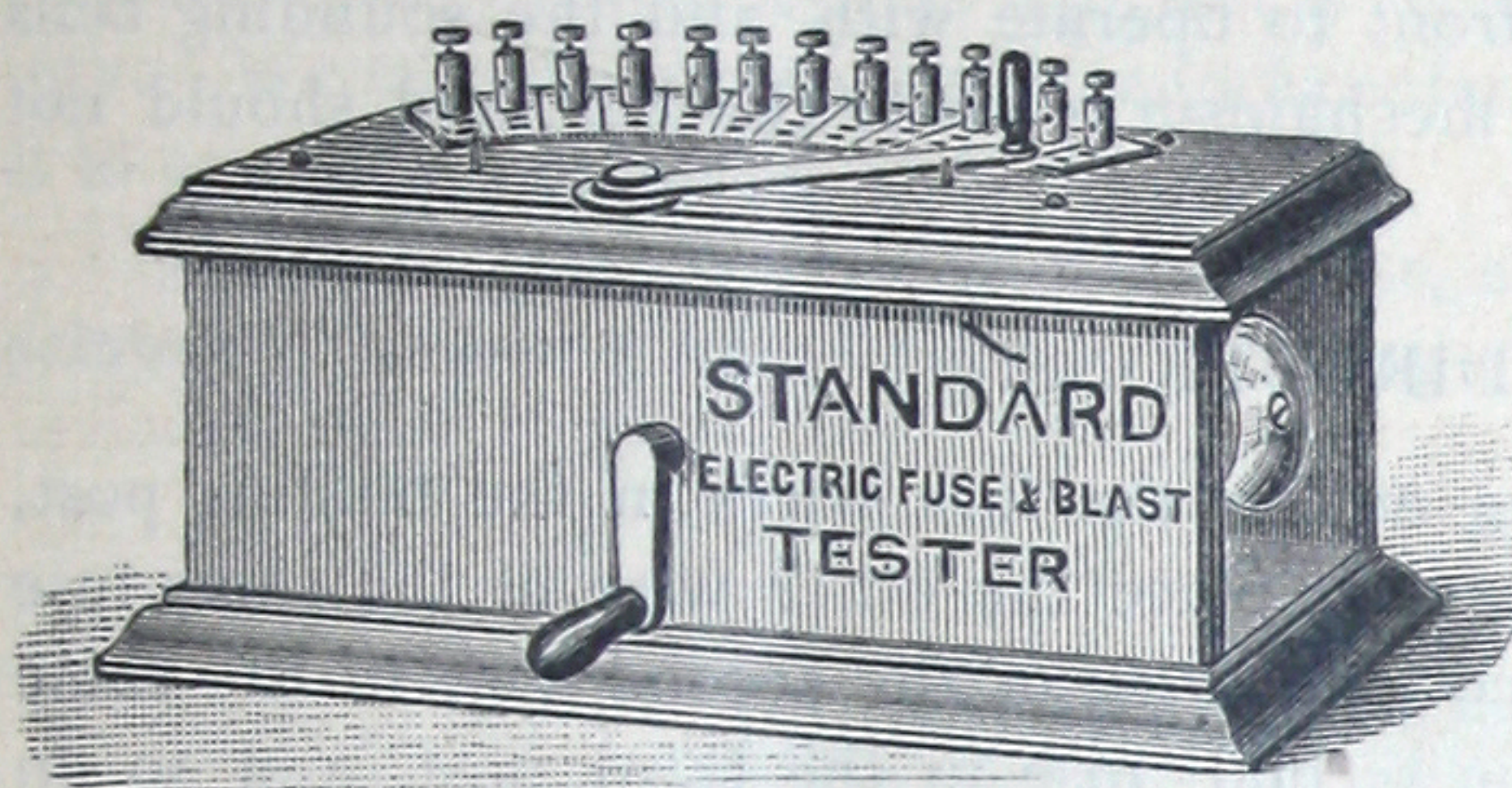
If it is desired to unscrew the lamp from its socket, be careful when putting it back to have it well down, so as to make a close connection in the bottom of the socket. Also before using the lamp, look if the fiber in the glass bulb is broken or burnt out.

This lamp is made specially for the purpose of testing the electrical conditions of the battery. The ordinary electric light lamp cannot be used for this purpose ; its voltage being too high. For our No. 1 machine we have a smaller lamp, adjusted to the strength of a machine for firing 5 to 8 holes. The battery should be tested with the lamp before firing the blast, even if the machine is known to be in good order ; as it will assist it in doing its work, by exciting the parts, thereby preparing them to better generate and contain the current, before sending it out to the lines to explode the charge. We are satisfied any battery or blasting machine will work better by being operated once or twice, immediately before attaching the leading wires to it to fire the blast. Some people differ with us in this opinion ; however, we know positively we can get a better light or flash on our testing lamp, on the third or fourth operation of the battery, than we can on the first or second. If we may be allowed the comparison, a trotting horse entered for the race, will do his mile better and easier by having a little exercise immediately before he starts ; so it is with the battery.





## THE STANDARD ELECTRIC FUSE AND BLAST TESTER.



Price, \$15.00.

The Standard Electric Fuse and Blast Tester is the first machine of the kind ever placed upon the market for this purpose, notwithstanding that electric fuses have been very generally used during the past fifteen years. This machine is intended to test electric fuses or exploders before placing them in the charge holes to blast, to

make sure that they are all right and perfect, so as to avoid the expense, trouble and danger of a miss-fire or an unexploded hole. To make doubly sure,—with the same machine the entire charge can be tested before putting the leading wire to the battery. If the blast fails after such testing, the trouble must be with the battery or powder. All blasters know the trouble and danger caused by a bad fuse in the charge; it necessitates the drawing of the charge hole or redrilling another hole, and many accidents and deaths have occurred in performing these dangerous operations.

All these dangers can be avoided by the use of the Standard Electric Fuse and blast Tester. The construction of this machine is so simple that any Superintendent or blaster can easily understand how to use it. With proper care it will last for years without repairs. For the past three years we have manufactured a superior quality of electric fuses, and have carefully tested each fuse before sending them out. It would, therefore, seem so far as our fuses are concerned, that there would be no need for such a testing machine; but as there are other makes of electric fuses, the manufacturers of which do not claim to test them, we consider this machine a proper one to place upon the market, so that consumers of electric fuses may know the quality of what they purchase.

The machine does not cost much, so if no bad fuses, or imperfect connections in the blast are found the satisfaction will recompense for the small outlay. If any defective fuses of our make are detected, we will willingly take them back and exchange them. We have tested all the different makes of electric fuses, and can recommend this machine to accurately test any of them.



## DESCRIPTION.

In all electric machines there must be a complete circuit. The same rule applies to this machine. Its size is 5 inches x 6 inches x 10½ inches, and weighs 10 lbs. It will test from one to twelve fuses at a time; it has thirteen binding posts on top of box, with a brass switch for completing the circuit a small handle in front to operate with, and the sounding bells on the right hand end. The mechanism is inside the box, and should not be interfered with or opened.

## DIRECTIONS.

Place one of the connecting ends of the fuse wires in the binding post, commencing at the right-hand post; place the other wire of the same fuse in the second post, then place one wire of the second fuse in the same post, and the other wire of the second fuse in the third post, and so on until all posts are filled, thus there will be one single wire in the two end posts, and two wires in all the others. Now place the switch on the brass base of the last or left hand post and turn the handle slowly a few times in the usual way—that is—from you (not backwards), when the bell will ring. If fuses are all good, then take them out and put in another lot.

If the bell does not ring, there must be one or more bad fuses in the lot. Find out which are the defective ones. To do this bring the switch to the first or right hand binding post and turn the handle. The bell will always ring when the switch is on the first post, because that makes a complete circuit. Now place the switch on the second post, and turn the handle. If the bell rings the first fuse is good; continue this way—that is, placing the switch on each post and turning the handle until you find one where the bell will not ring; take this fuse out and put in another one in its place; then throw the switch back to the extreme left, and turn the handle again. If the bell rings all are good; if it does not ring bring the switch back to where you left off and try each one separately until you find the next bad one; take it out and replace it as before. It is easy to know which is the bad fuse—it is *always the one with its second wire under the switch from the right of the machine*. If you desire to test a less quantity than the machine will hold bring your switch to the binding post to which the last wire is attached. You can test one fuse by putting one of the wires in the right-hand post, and the other wire in the left post. Put the *switch on the left in all cases*, the first fuse wire must be put in the first or right hand post as the circuit commences there, and ends wherever the switch is placed, the fuses making the connection between. Always place the switch on the centre of the brass base of binding posts, and not over the edge.

To test the entire blast before firing, simply place the ends of the leading wire in the right and left binding posts, placing the switch on the left post, turn the handle, when the bell will ring. Leading wire should often be tested separately, as it is liable to crack and break in bending, and have imperfect joints; its heavy insulation makes it difficult to find these defects without the *standard tester*.

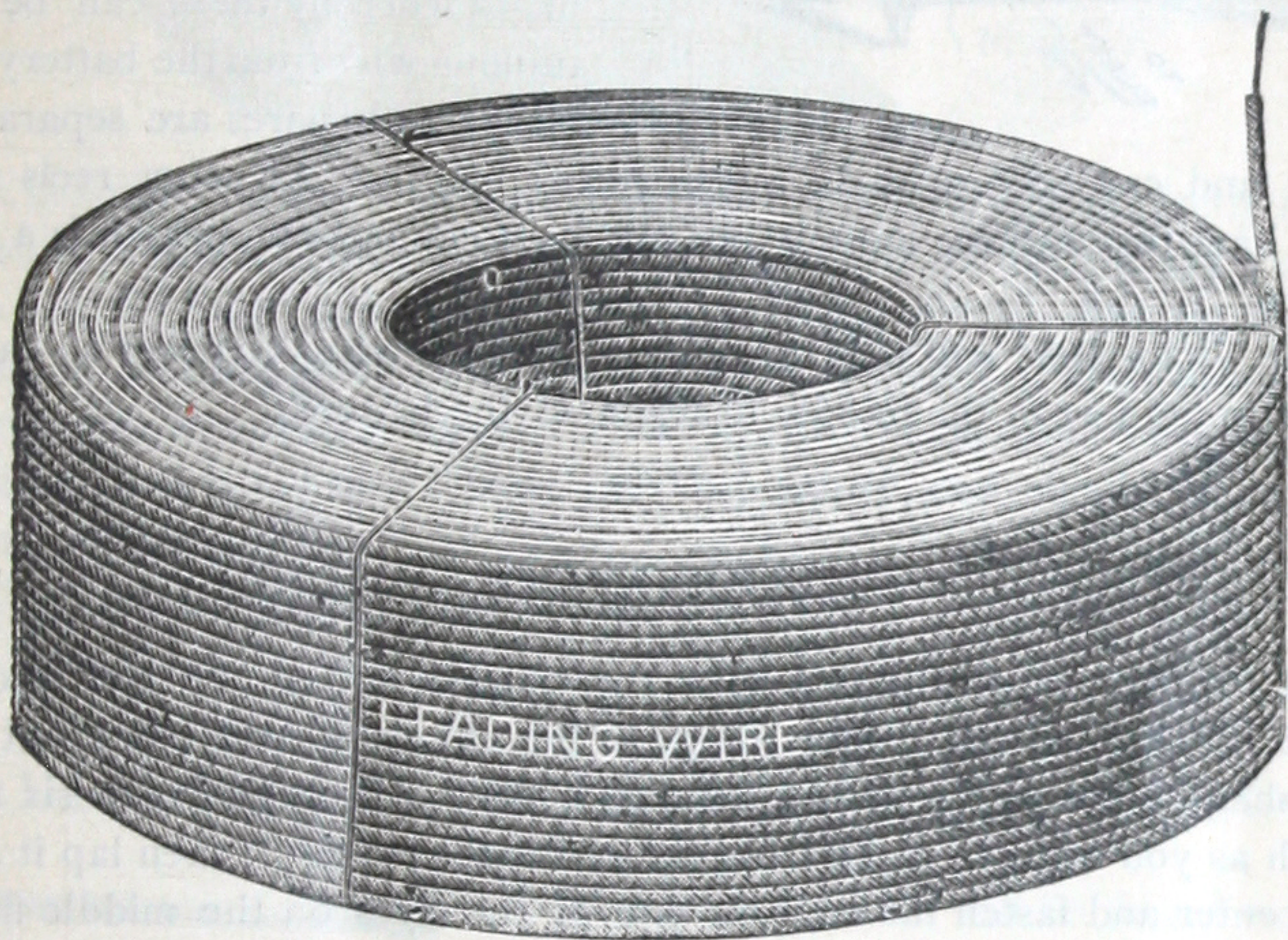
To make sure the machine itself is in perfect order, place the switch on the right-hand post, and turn the handle; if the bell rings the machine is in good order.



## LEADING WIRE.

This wire is for the purpose of carrying the electric current from the battery to the fuse wires, for the purpose of exploding the fuses ; and should be of the purest copper, about 14 gauge wound and braided with cotton, and waterproofed. About 250 to 350 feet is required for each side of the battery. We manufacture this wire, and have facilities for measuring and coiling it in any length required.

This wire is much exposed when in use, and should be very heavily insulated to prevent it from wearing. It being a heavy wire, it is liable to crack



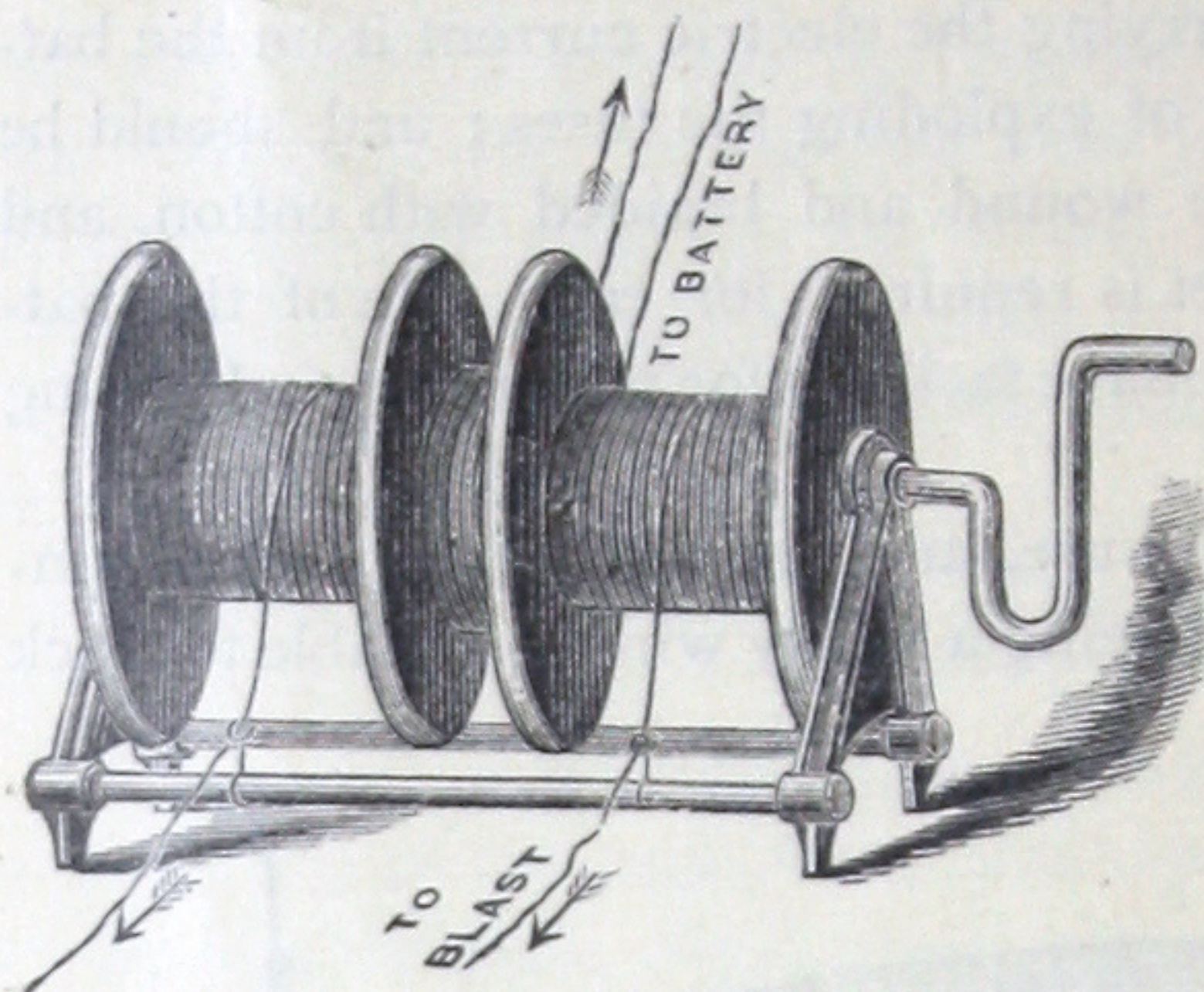
or break by coiling, or by rocks falling upon it. These breaks are difficult to detect, and the wire should be tested daily when in use, with our electric tester ; which can be done by placing each end of the wire in the binding post on each end of the tester, and turning the handle. The bell will ring if the wire is all right ; if the bell does not ring, there is a break or bad joint in the wire. This wire should be kept in a dry place when not in use.

Every blaster should have one of our Standard Testers.





## VICTOR LEADING WIRE REEL.



In electric blasting, Leading Wire forms a very important part, and great care should be taken to have it in good condition and in a convenient form to use. The Victor Reel is a simple and practical device to keep the Leading Wire on ; it is strong and durable, and handy to carry about. It is the only reel made whereby there can be a continuous wire from the battery to the blast—both wires are separated on

the reel and can be run off in any required length. All other reels on the market have two or three loose joints, and bare connections, which is a serious objection.

The Victor Reel will hold over 1,000 feet of wire, 500 feet on each end and five to ten feet in the middle to reach to the battery.

## DIRECTIONS.

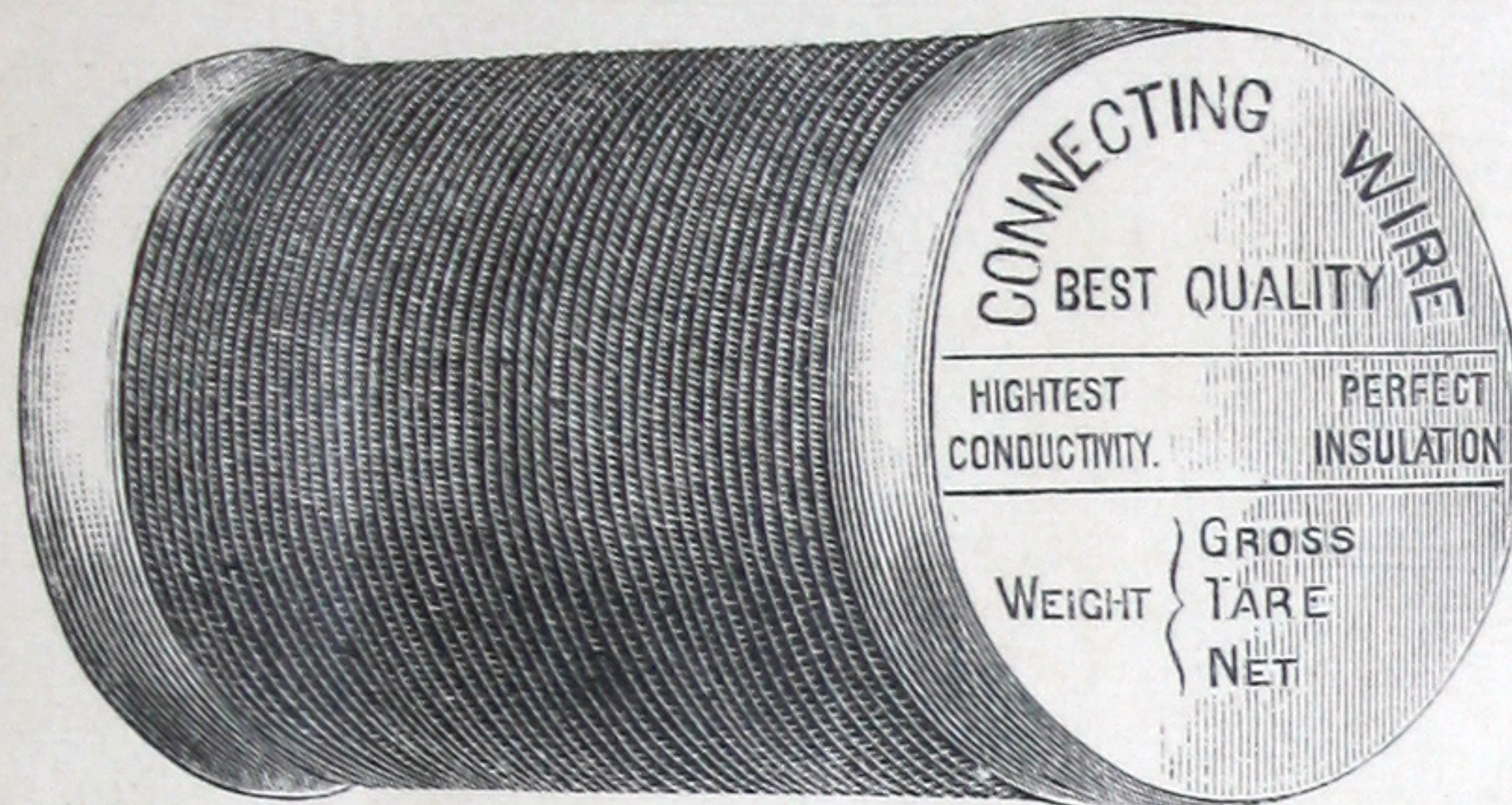
To put the wire on the reel, take the outside end of the coil and put it through the hole in the center flange at the shank (it will come out on the center shank between the middle flanges) ; draw it through five or six feet, or as much as you want to reach from the reel to the battery ; then lap it around in the center and fasten the ends in one of the eyes on the middle flanges ; then hook the wire into the tension guide on the cross bar, and turn the handle until half the coil is wound on ; then cut it and do the same with the balance on the other side. The center wires should be wound on the spool in the opposite direction to the wires on the end of the spool. After firing, release the wires both at the battery and at the blast and turn the handle, when the wire will wind up from both directions at the same time. The wire coming from the battery being shorter, will be wound up first ; fasten its ends in the eyes and continue to turn until all is wound up. In drawing *in* the wire hook it into the tension guide—this makes the wire draw tight and firm on the spool. In running the wire off the spool release it from the tension guide. The handle is so constructed that it can be used for the double purpose of turning and carrying. The reel is also arranged to be set on its end when not in use.

Leading Wire is very liable to crack and split from constant bending and jarring and should occasionally be tested with our Standard Electric Fuse and Blast Tester.



## CONNECTING WIRE.

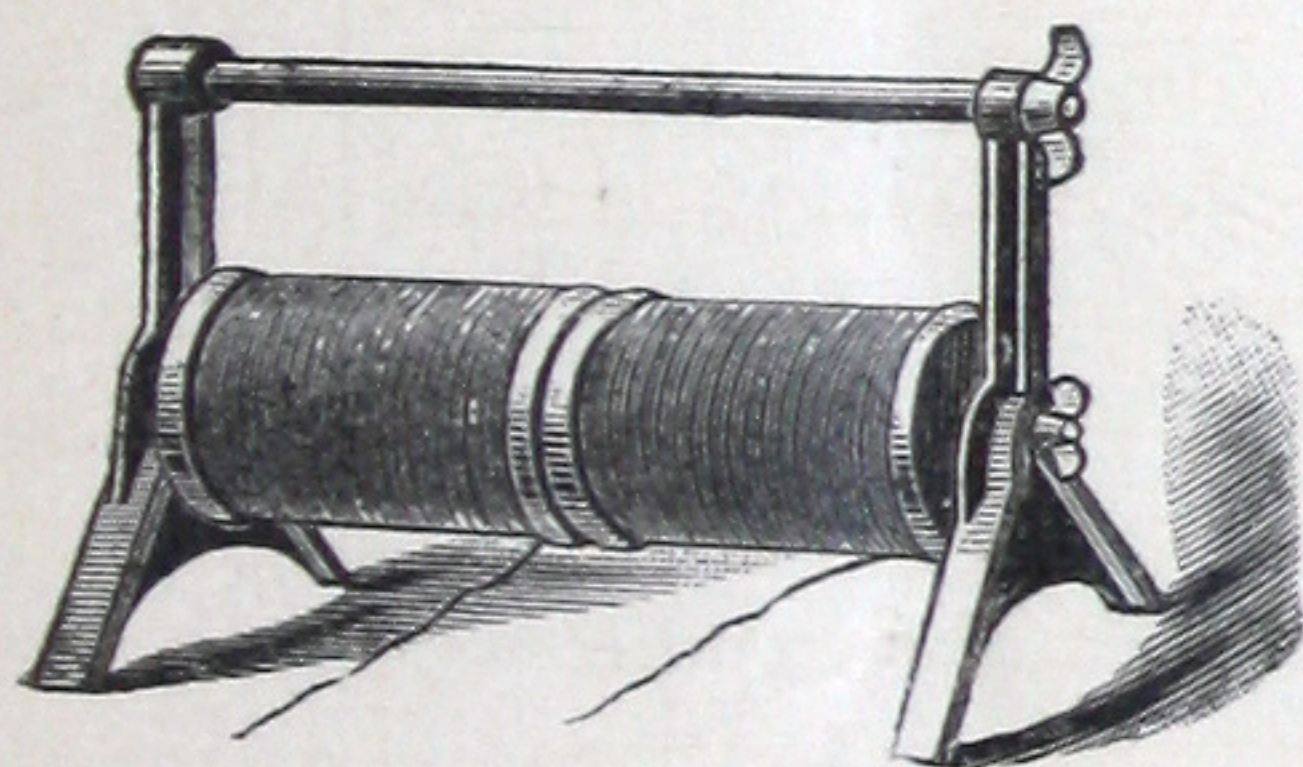
This wire is used for the purpose of connecting together the fuse wires in the charge holes, when holes are far apart.



It is a pure copper wire ; same size as our fuse wires, perfectly insulated and waterproofed. We put it up on 2, 5, and 10 lb. spools. the 2 and 5 lb. spools are the most convenient. We manufacture this wire for the special purpose of blasting ; and will warrant it to be uniform, well insulated, and the same size as our fuse wires. There is much cheap connecting wire in the market, which is not made from the best copper, and should be avoided for blasting purposes.

The best is none too good for this purpose.

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 "VICTOR" CONNECTING WIRE HOLDER.


This simple device will be found very useful and handy for carrying Connecting Wire to the blast. When connecting the holes, or when not in use, it can be set upon the ground without danger of having the spools or wire get wet or dirty, it will also prevent snarling or kinking of the wire when cutting off the quantity desired. It will also be found convenient in the shop or store. It is arranged to hold two spools, weighing two to five pounds each, which are the sizes most used in electric blasting.

## DIRECTIONS.

Unscrew both thumb-screws on the end and take off the end piece ; then slide the spools on the lower bar. Put the end piece on again, and tighten up the thumb-screws. The top bar is to be used as a handle for carrying.



# WIRE CONNECTING WIRE

This wire is used for the purpose of connecting together the two wires in the cable boxes, which boxes are in the

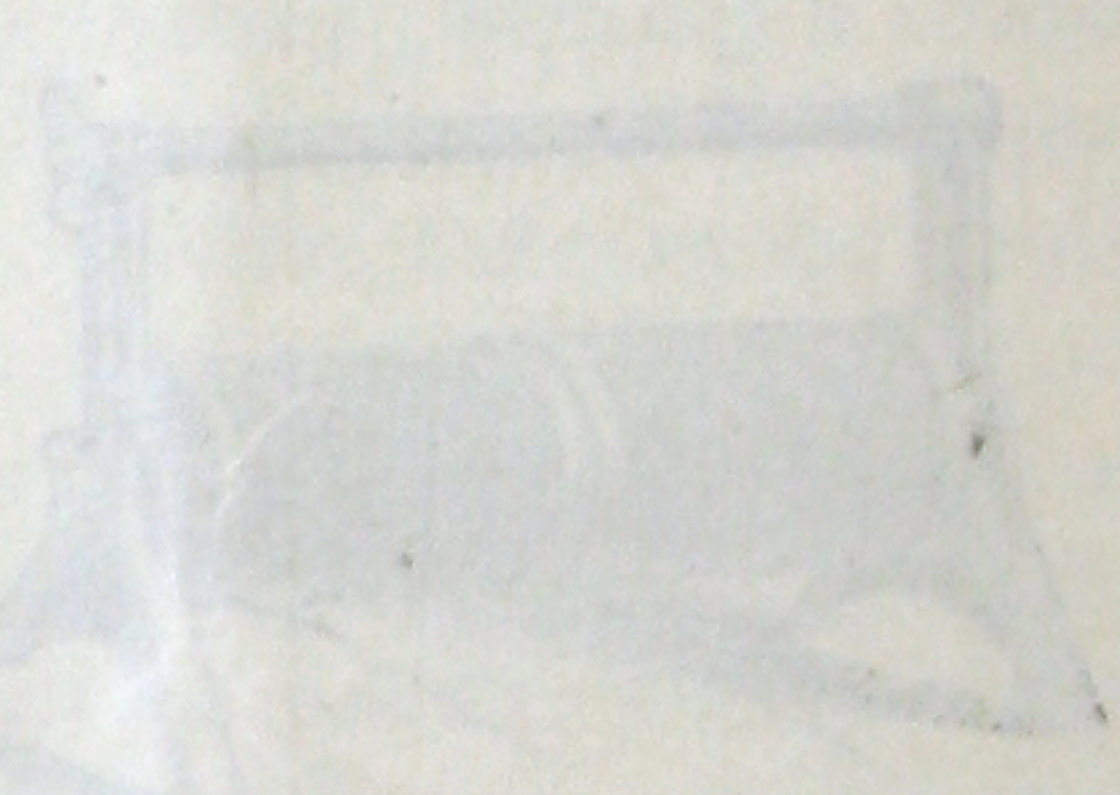


It is a point to be noted that the wire is not to be used for the purpose of connecting the two wires in the cable boxes, which boxes are in the

The best is a wire of good quality and of the

## VICTOR WIRE CONNECTING WIRE

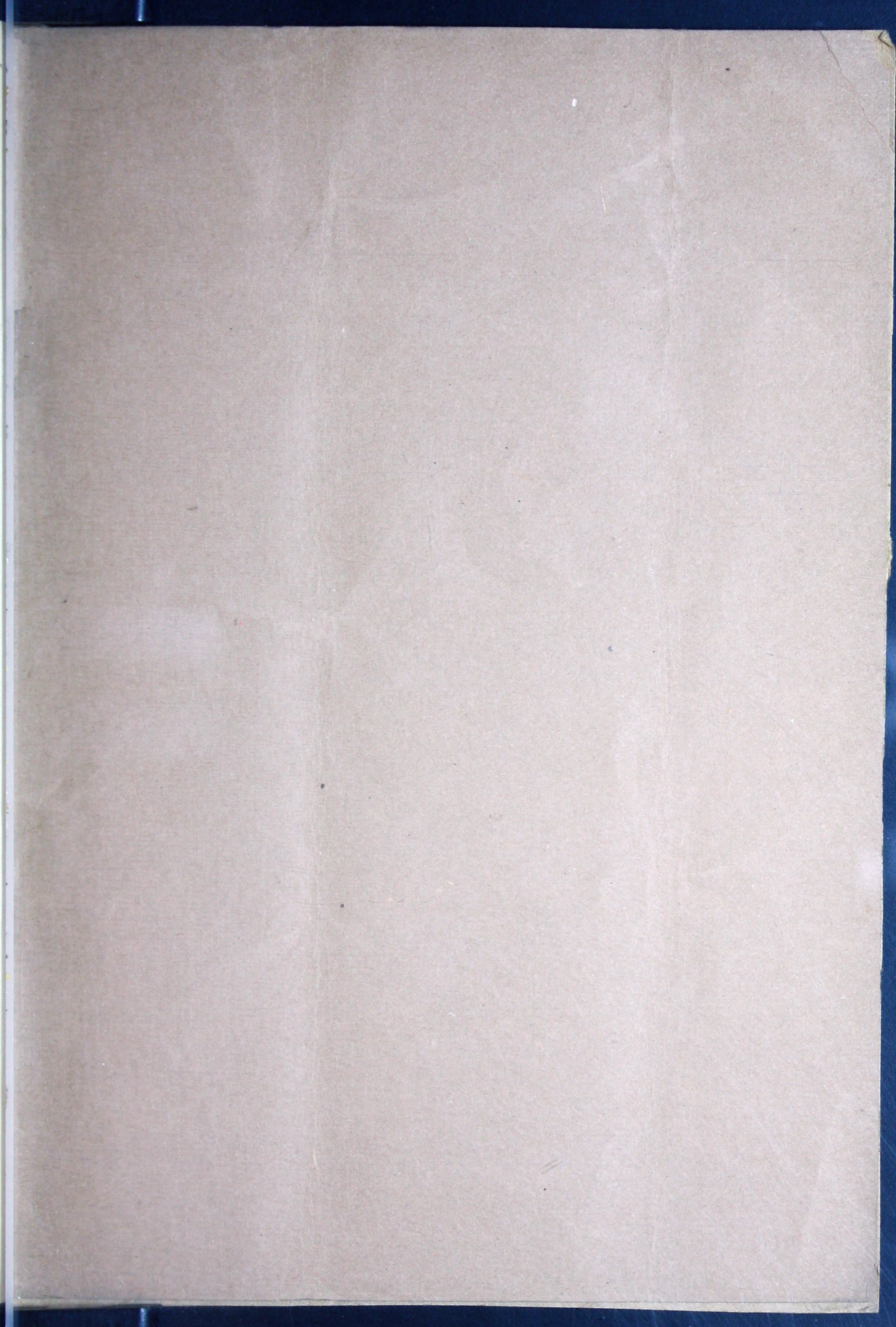
This simple device will be found very useful and handy for carrying out the work in the plant. When connecting the boxes or other parts it can be seen that the wire is not to be used for the purpose of connecting the two wires in the cable boxes, which boxes are in the



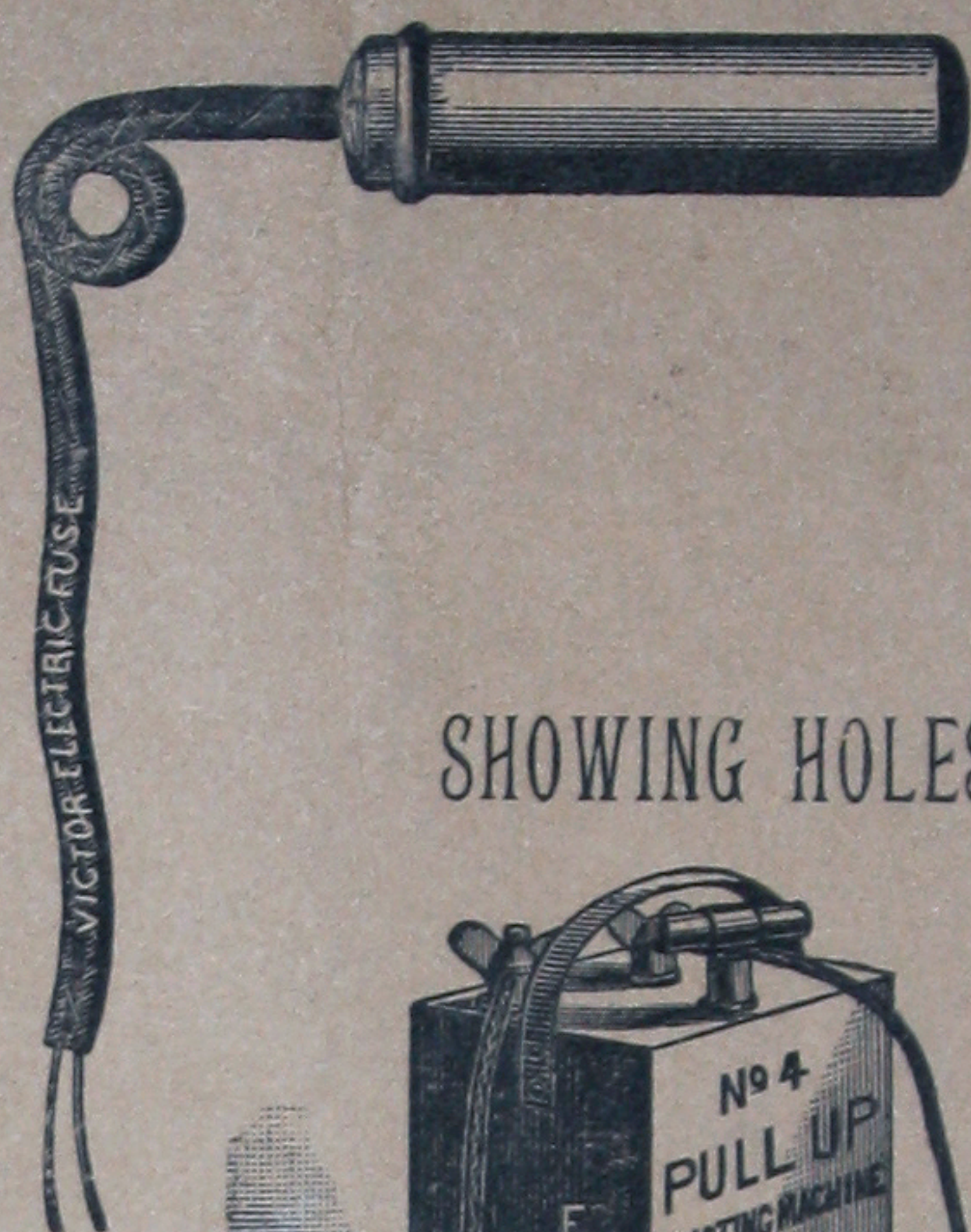
### WIRE THIN

Under both circumstances on the end and side of the wire, the wire is not to be used for the purpose of connecting the two wires in the cable boxes, which boxes are in the

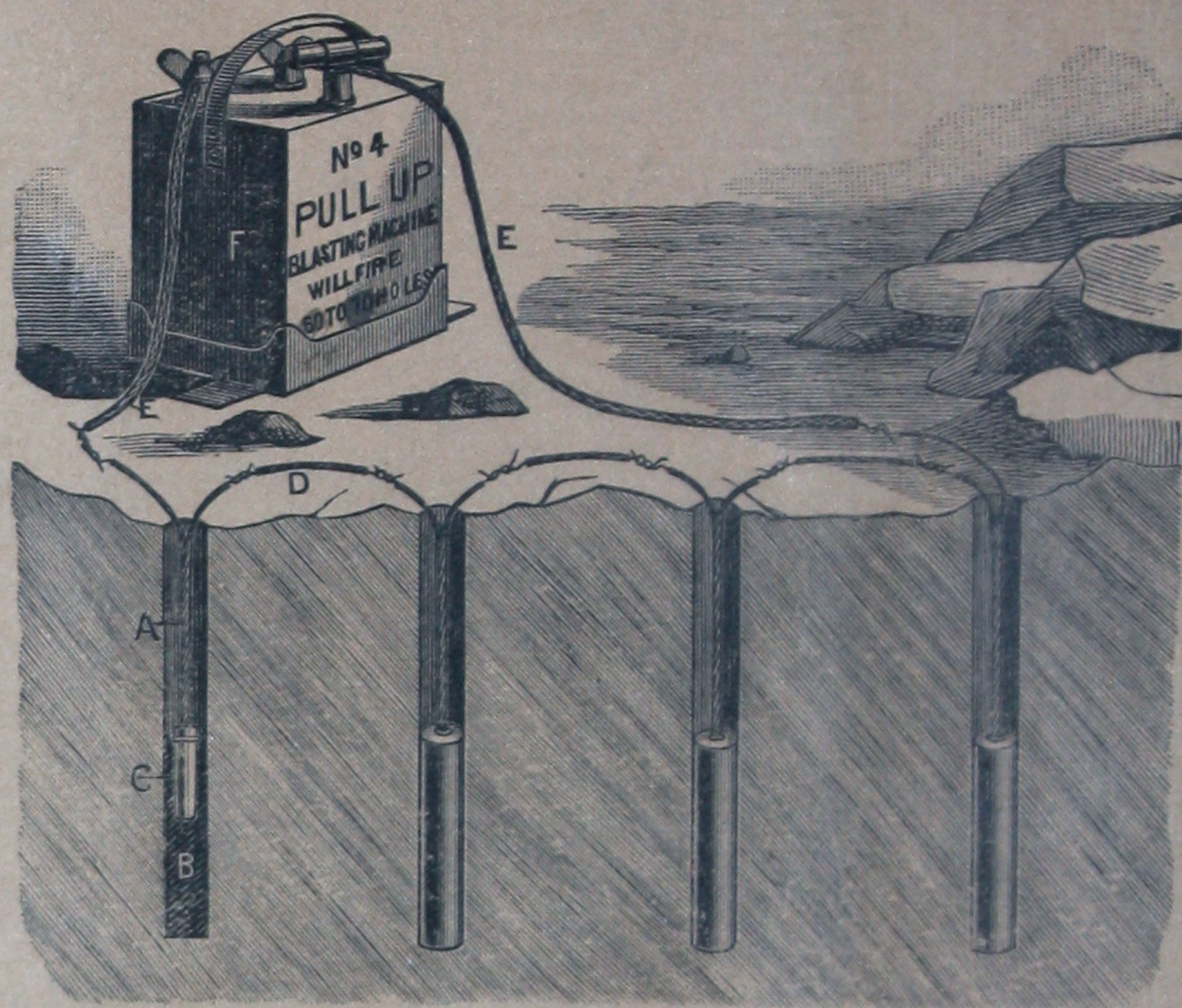




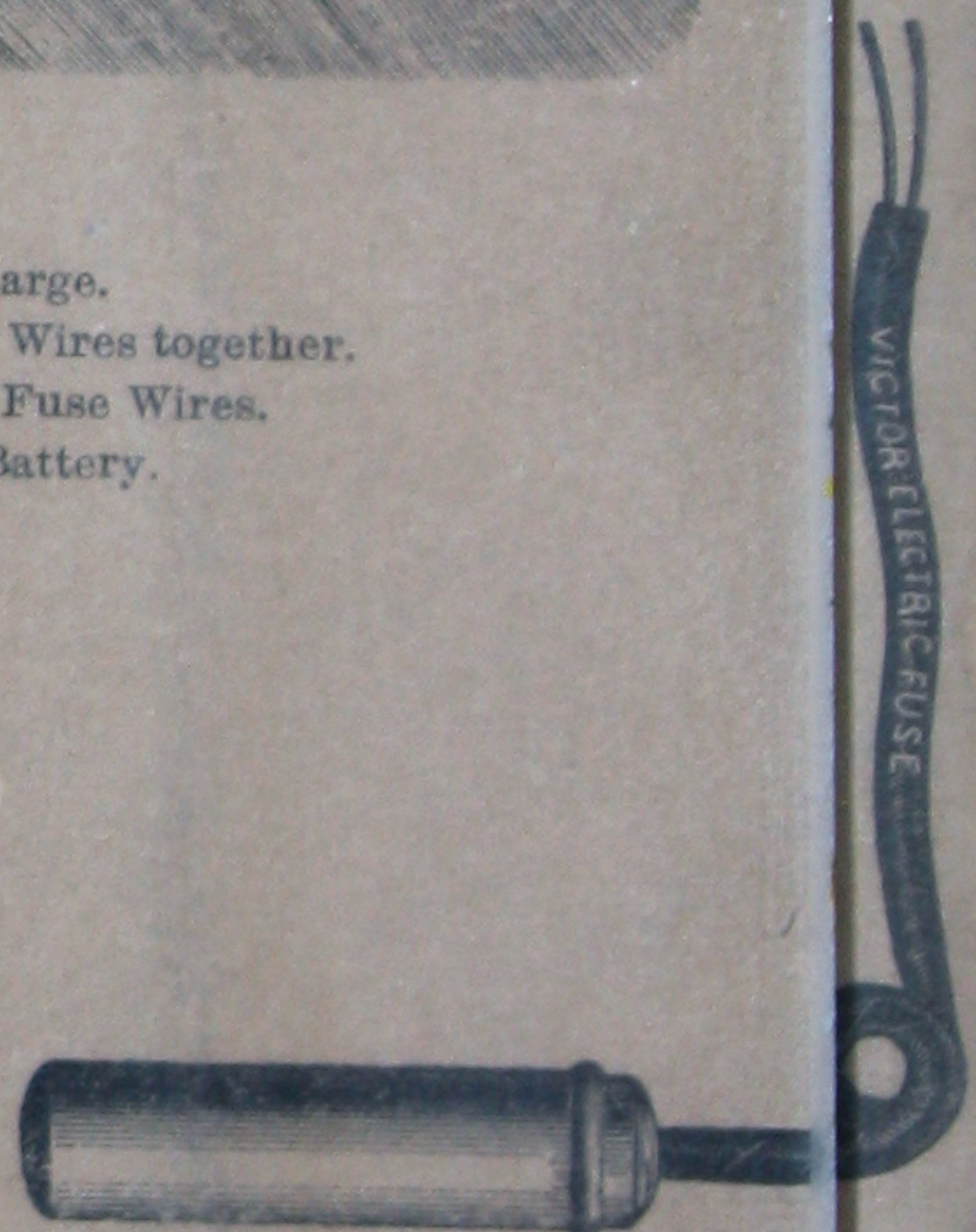
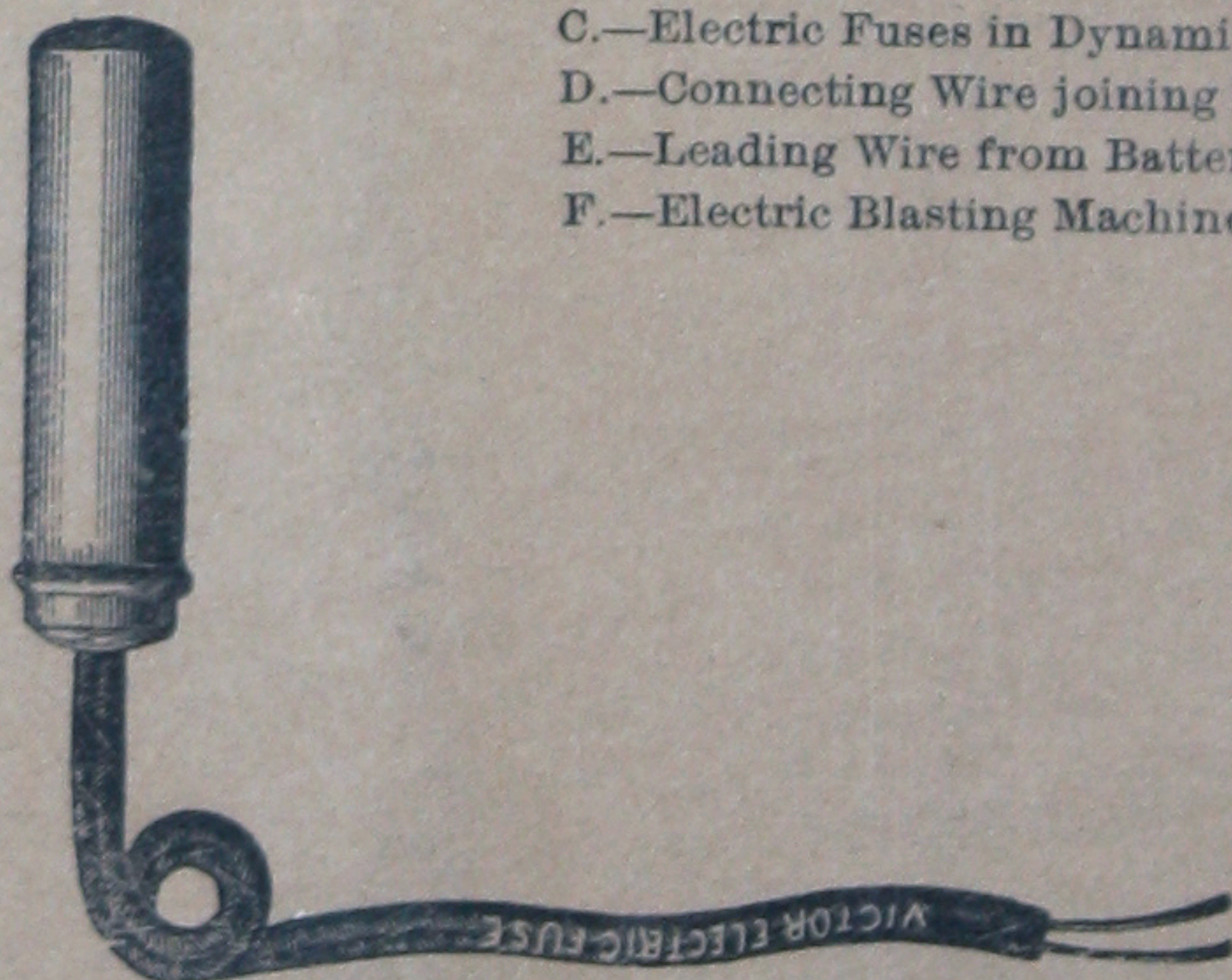




## SHOWING HOLES CONNECTED IN SERIES.



- A.—Hole in Rock.
- B.—Dynamite Charge in Hole.
- C.—Electric Fuses in Dynamite Charge.
- D.—Connecting Wire joining Fuse Wires together.
- E.—Leading Wire from Battery to Fuse Wires.
- F.—Electric Blasting Machine or Battery.





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